RAILROAD GAZETTE

FRIDAY, OCTOBER 25, 1878.

Ashcroft's Patent Oil-Testing Machine.

The engraving and description of this machine published herewith are taken from the *Polytechnic Review:*

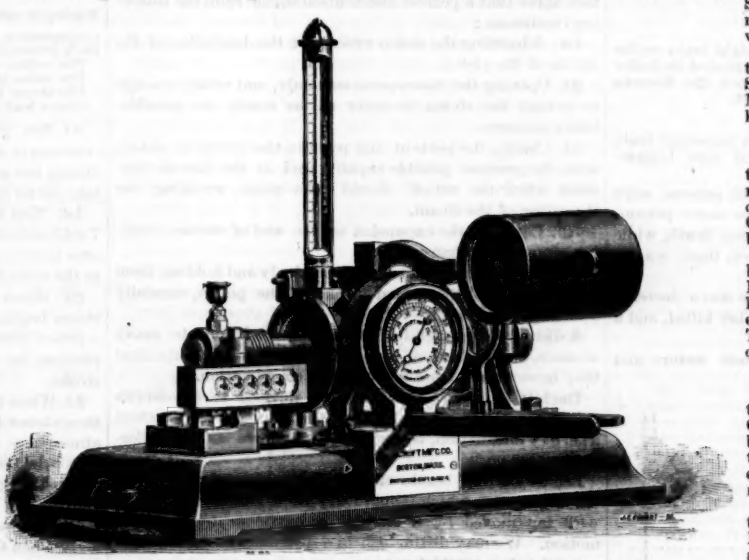
In the accompanying illustration we present to our readers an improved and efficient patent oil-testing machine, manufactured by the Ashcroft Manufacturing Company, of No. 51 and 53 Sudbury street, Boston, Mass. It consists of a line spindle, accurately fitted in bearings, firmly and rigidly secured to an inflexible bed-plate. Upon this spindle are fitted a fast and loose pulley for starting and stopping it, and two brass steps, with a weighted lever for testing the oil. To register the revolutions made during a test, a counter, or revolution indicator, is attached; and, to indicate the temperature, a thermometer is affixed; while the total pressure in pounds and the coëfficient of friction are shown by a gauge provided.

The operation is as follows: Suppose a given quantity of oil shows under test 160° of heat when the machine is driven at a speed of 10,000 revolutions per minute, and another grade of oil shows 160° when the machine runs at 7,500 revolutions per minute, the exact cash value of the second will be but 75 per cent. of the first; and in this way the exact money value of any oil may be accurately ascertained. In addition, however, to this practical test, the machine may be driven until a higher temperature is reached, so as to see which oil produces the worst residue, and in view of the heating of journals from the oil holes becoming gummed up, this is an important feature of this machine.

In operation four drops of the oil to be tested are dropped into the receiving cup from a brass dropping-tube, the temperature noted, and the machine started and run until a given degree of temperature is reached (the standard being about 200°). The machine is then stopped, and the number of revolutions it has run during the test are read off the indicator.

The testing may be made to answer any required conditions by varying the speed of the machine and regulating the weight upon the lever, thus testing the oil under the precise conditions under which it is required to use it.

This machine has attracted considerable attention from railroad companies, among which may be mentioned the Eastern Railroad and the Chicago, Burlington & Quincy Railroad, the Grand Trunk Railroad, and is also in use in the Washington and Brooklyn Navy-Yards.



ASHCROFT'S PATENT OIL-TESTING MACHINE.

Train Accidents in September.

The following accidents are included in our record for the month of September:

REAR COLLISIONS.

Very early on the morning of the 4th a freight train on the New York, Lake Erie & Western road, which was going up the grade near Susquehanna, Pa., with a pusher in the rear, broke in two, and the pusher drove the rear cars into the forward ones, wrecking four cars.

On the 6th a passenger train on the Washington City, Virginia Midland & Great Southern road ran into the rear of a repair train near Culpepper, Va., and the engine and some cars were badly damaged.

On the 6th a passenger train on the Atchison, Topeka & Santa Fe road ran into the rear of a freight train, which had stopped on the main track near Newton, Kan., wrecking the caboose and five box cars and throwing the passenger engine from the rails.

On the afternoon of the 7th a switching engine in the Chicago & Northwestern yard at Fort Howard, Wis., suddenly started off with no one on board, ran up the yard and into the rear of a freight train standing on the track, wrecking the caboose.

On the afternoon of the 12th, as an engine pushing the "trackometer" car was running at a rapid rate through the yards of the Pennsylvania Railroad at Altoona, Pa., it struck the rear car of a freight train, which was just pulling out of the yard. The "trackometer" car, which is rather low, was forced in under the box-car, damaging both. A number of local officers of the road were on the car, of whom four were badly and four others less severely hurt.

On the night of the 12th a freight train on the Southwest Pennsylvania road broke in two near Greensburg, Pa., and the rear portion ran into the forward one, wrecking several cars and blocking the road three hours.

On the night of the 13th a passenger train on the New York Central & Hudson River road ran into a box car, which a high wind had blown from a siding upon the main track at Pittsford, N. Y. The car was wrecked, the engine damaged, the engineer and fireman slightly hurt.

On the evening of the 14th a passenger train on the Texas & New Orleans road ran into some freight cars which had been left standing on the main track near Orange, Tex., damaging the engine and cars and killing the fireman.

On the 16th a freight train on the Chicago, Rock Island & Pacific road ran into some cars which had broken loose from a preceding wood train near Beverly, Mo., wrecking the caboose and two flat cars and killing the foreman of the wood gang. The break in the wood-train was due to a coupling not properly made, the pin being too large.

On the 16th a freight train on the Boston & Albany road ran into the rear of a preceding freight near Schodack, N. Y., wrecking several cars.

On the night of the 23d a freight train on the New York, Lake Erie & Western ran into the rear of a preceding freight near Painted Post, N. Y., wrecking the caboose and three loaded box-cars. The fireman was hurt.

On the 24th a freight train drawn by two engines on the Denver & Rio Grande road ran over a misplaced switch and into some cars standing on a siding at Chicosa, Col. Both engines and several cars were badly broken, a fireman killed and an engineer hurt.

On the afternoon of the 24th a freight train on the New York, Lake Erie & Western road ran into the rear of a preceding freight, which was just pulling into a siding at Narrowsburg, N. Y. Several cars were wrecked and the engine thrown over down a bank, blocking the road several hours. It is said that the first train had no signal out.

On the afternoon of the 27th a passenger train on the Metropolitan Elevated road ran into the rear of another, which was stopping at the Bleecker street station in New York. A car was badly damaged and the conductor hurt.

BUTTING COLLISIONS.

On the 3d there was a butting collision between two passenger trains on the Southwestern Railroad, of Georgia, at Cuthbert, Ga., by which both engines were somewhat damaged.

On the 5th there was a butting collision between two freight trains on the Chicago & Alton road, near Lexington, Ill., by which both engines were badly broken and some cars damaged.

On the morning of the 6th there was a butting collision between two local passenger trains on the Missouri Pacific road near Grand-avenue crossing in St. Louis, Mo., by which two engines and a baggage car were badly broken and five persons slightly hurt. The accident is said to have resulted from the carelessness of the men on one of the trains, and the conductor and engineer were arrested.

On the night of the 6th a St. Paul, Stillwater & Taylor's Falls passenger train ran into the head of a St. Paul & Duluth freight, which was backing into a siding in St. Paul, Minn. The passenger engine was slightly and the freight badly damaged.

On the evening of the 9th there was a butting collision between a freight train and a wild engine on the Fort Wayne, Muncie & Cincinnati road, near Connersville, Ind., by which both engines were badly damaged.

On the morning of the 14th there was a butting collision between two freight trains on the New Jersey Southern road in Long Branch, N. J., by which both engines were slightly damaged.

On the night of the 13th there was a butting collision between two trains on the Western North Carolina road, near Catawba, N. C., doing slight damage to both engines.

On the 16th, in Milwaukee, Wis., on the Chicago, Milwaukee & St. Paul road, there was a butting collision between a passenger and a gravel train, by which both engines and several cars were damaged and one laborer hurt.

On the evening of the 21st there was a butting collision between a Toledo, Peoria & Warsaw freight train and a Peoria, Pekin & Jacksonville switching engine in the yard at Peoria, Ill. Only slight damage was done to the engines.

On the night of the 21st there was a butting collision between two freight trains on the Grand Trunk road near Camlachie, Ont. Both engines were thrown down a bank and badly broken and 17 cars were wrecked.

On the afternoon of the 26th there was a butting collision between a passenger train and the pay-train on the Southern Railroad of Long Island, near Fresh Ponds, N. Y. Both engines were damaged and two passengers hurt. It is said that an order had been given to hold the passenger train at Fresh Ponds, but the operator failed to deliver it.

On the morning of the 30th there was a butting collision between two freight trains on the Hannibal & St. Joseph road near Kidder, Mo., by which both engines and several cars were badly damaged and the road blocked four hours.

CROSSING COLLISION.

On the morning of the 26th a Chicago, Milwaukee & St. Paul freight struck a Chicago & Nortwestern passenger train at the crossing of the two roads in Watertown, Wis. The freight-engine was damaged, two cars of the passenger thrown over and badly broken.

DERAILMENT, BROKEN RAIL.

On the 18th a freight train on the St. Louis & Southeastern road was thrown from the track near Goodlettsville, Tenn., by a broken rail.

DERAILMENT, BROKEN WHEEL.

On the morning of the 12th a passenger train on the Long Island road was thrown from the track near Blissville, N. Y., by the breaking of a truck-wheel under the engine. The engine rolled over down a bank, dragging the three cars after it and breaking them badly. One passenger was killed, the engineer and 8 passengers hurt.

DERAILMENT, BROKEN AXLE.

On the morning of the 25th two cars of a freight train on the Atlantic & Great Western road were thrown from the track by a broken axle near Sugar Grove, Pa., and slightly damaged.

DERAILMENT, BROKEN DRAW-HEAD.

On the afternoon of the 11th several cars of a coal train on the Hawley Branch of the New York, Lake Erie & Western road were thrown from the track by a draw-head which pulled out of one of the cars.

DERAILMENT, SPREADING OF RAILS.

On the evening of the 18th two cars of a freight train on the Missouri Pacific road were thrown from the track in Atchison, Kan., by the spreading of the rails.

DERAILMENTS, WASH-OUTS AND LAND-SLIDES.

On the morning of the 4th a passenger train on the Alexandria & Fredericksburg road ran into a washed-out culvert at Telegraph Road, Va. Two cars went into the gap and were damaged and two trainmen were hurt slightly.

On the afternoon of the 5th a passenger train on the Martha's Vineyard Railroad was thrown from the track by a land-slide, near Edgartown, Mass.

On the night of the 12th a construction train on the Chesapeake & Ohio road ran into a wash-out near Cannelton, W. Va. The engine was wrecked and the engineer killed.

On the night of the 12th a freight train on the Pittsburgh, Cincinnati & St. Louis road went into a creek near Reed's Mills, O., where a bridge had been washed out by a sudden freshet, and the engineer and fireman were caught under the engine and killed.

On the 13th a freight train on the Washington City, Virginia Midland & Great Southern road ran into a land-slide near Barboursville, Va., wrecking the engine and several cars, killing two trainmen and injuring two others.

On the 13th a freight train on the Atlantic & Great Western road ran into a wash-out near Windham, O., wrecking six cars.

Very early on the morning of the 13th a freight train on the Erie & Pittsburgh road went into Big Run, near Shenango, Pa., where a short bridge had been carried out by a sudden freshet. The engine and nine cars were piled up at the bottom of the stream, the fireman and a brakeman killed and the engineer hurt so that he died next day. A curious thing about this accident is that the surviving trainmen say that the bridge was standing when the train reached it, while others are equally sure that it was gone some time before, one abutment and the bank behind it being washed out.

On the morning of the 13th a freight train on the Erie & Pittsburgh road ran into a washed-out culvert near Jamestown, Pa., the engine being wrecked, the fireman killed and the engineer hurt.

On the morning of the 13th a freight train on the Atlantic & Great Western road ran into a washed-out culvert near Franklin Junction, Pa., the engine falling into the gap with five cars on top of it. The engineer, fireman and a brakeman were killed.

On the night of the 13th a freight train on the Pittsburgh, Cincinnati & St. Louis road ran into a wash-out near Holliday's Cove, W. Va., the engine going down into the gap with 12 cars after it. Water was running high through the gap, and the engineer was nearly drowned before he worked himself out of the wreck.

On the night of the 13th a freight train on the Pittsburgh, Fort Wayne & Chicago road ran into a washed-out culvert near Salem, O., and the engine went down into the gap with two cars on top of it. The engineer, fireman and a brakeman were hurt.

On the 14th a freight train on the Lake Shore & Michigan Southern road ran into a washed-out culvert near Kinsman, O., the engine going down with eight cars piled up on top of it.

On the morning of the 25th a passenger train on the Chicago & Michigan Lake Shore road ran into a wash-out near Caloma, Mich. The engine was wrecked, a trainman killed and one passenger hurt.

DERAILMENTS, ACCIDENTAL OBSTRUCTION.

On the night of the 2d a freight train on the Pittsburgh, Cincinnati & St. Louis road ran into a large tree which had been blown down across the track near Adams' Mill, O., wrecking the engine and eight cars and blocking the road four hours.

About noon on the 5th the engine of a westbound freight train on the Pennsylvania Railroad ran into the wreck of a car which had just before jumped the track on an east-bound freight at Chickies Bridge, Pa. The engine was thrown from the track, went over into a culvert and was badly damaged.

DERAILMENTS, CATTLE.

On the 8th a passenger train on the Central Railroad of Georgia ran over a cow near Crawford, Ga., and the engine, two ice cars, baggage and smoking cars, were thrown from the track and badly wrecked, injuring the engineer and fireman. The damage is estimated at $12,000.

On the evening of the 12th a milk train on the Sussex Railroad ran over two cows near Monroe Corner, N. J., throwing the engine and tender from the track.

On the morning of the 28th the engine and two cars of a passenger train on the Intercolonial road were thrown from the track by a horse which had strayed upon the road near Memramcook, N. B., and the engine ran down the bank and upset into a bog-hole, where it sunk nearly out of sight.

On the 29th a passenger train on the Central Pacific road struck a cow near Lathrop, Cal., and the engine was thrown over on its side, blocking the road some hours.

DERAILMENTS, MISPLACED SWITCH.

On the 5th a passenger train on the Evansville & Terre Haute road was thrown from the track by a misplaced switch near Stacer's, Ind., and the engine and baggage car were thrown across the track and badly damaged, blocking the road seven hours.

On the afternoon of the 5th the engine of a freight train on the Windsor & Annapolis road was thrown from the track by a misplaced switch in Annapolis, N. S., blocking the road two hours.

On the evening of the 5th the engine of a fruit train on the Chicago & Michigan Lake Shore road was thrown from the track by a misplaced switch in St. Joseph, Mich. The engine upset and was damaged, injuring the engineer.

On the 30th the engine and two cars of a passenger train on the Louisville & Nashville road were thrown from the track at Bowling Green, Ky., by a misplaced switch, and one car badly broken, injuring three persons.

DERAILMENT, OPEN DRAW.

On the morning of the 21st the engine and five cars of a freight train on the Carolina Central road went through an open draw and into the river at the bridge over Cape Fear River, near Wilmington, N. C.

DERAILMENTS WITH MALICIOUS INTENT.

On the night of the 6th a freight train on the St. Louis & Southeastern road was thrown from the track near Hopkinsville, Ky., where a rail had been removed from the track. The engineer was badly hurt. A discharged section hand was arrested on suspicion.

On the night of the 6th a freight train on the Indianapolis, Cincinnati & Lafayette road was thrown from the track near St. Mary's, Ind., where a rail had been removed by some persons unknown. The road was blocked several hours.

On the evening of the 23d a passenger train on the Philadelphia & Reading road was thrown from the track by a misplaced switch at Auburn, Pa. The engine was thrown over against some freight cars on a siding and damaged; four cars were thrown over and somewhat broken, and two passengers were hurt. The switch is said to have been purposely misplaced.

On the 24th the engine of a passenger train on the New Brunswick Railway was thrown from the track near Grand Falls, N. B., by obstructions placed on the track.

On the night of the 30th a passenger train on the Missouri, Kansas & Texas road struck a tie which had been placed across the rails near Osage Mission, Kan., and the engine was thrown from the track.

DERAILMENTS, UNEXPLAINED AND MISCELLANEONS.

On the morning of the 1st a freight train on the Balti-

more & Ohio road ran off the track near Annapolis Junction, Md., wrecking several cars and blocking the road some time.

On the afternoon of the 1st a car in a freight train on the Wabash road ran off the track in Logansport, Ind.

On the afternoon of the 3d, the engine and seven cars of a freight train on the Ohio & Mississippi road were thrown from the track near Vincennes, Ind.

About noon on the 5th a car in a freight train on the Pennsylvania Railroad, ran off the track at Chickies Bridge, Pa., and was thrown over upon the opposite track and badly wrecked.

On the morning of the 12th the engine of a passenger train on the Cumberland Valley road ran off the track near Chambersburg, Pa., blocking the road four hours. The engine was badly damaged.

On the morning of the 14th, as a freight train was backing out of the Atchison & Nebraska yard at Atchison, Kan., the rear car jumped the track and two others were thrown over against it, wrecking it badly.

About noon on the 14th, as a repair train on the Shepaug Railroad was running backward near Shepaug, Conn., the rear car jumped the track and three others were piled up on top of it and badly wrecked. Two trackmen were killed and one hurt so that he died in a few days. The road was blocked a whole day.

On the morning of the 17th the engine of a passenger train on the Atchison, Topeka & Santa Fe road ran off the track in the yard at Atchison, Kan.

On the afternoon of the 19th a passenger train on the Pittsburgh Southern road ran off the track near Castle Shannon, Pa., and one car turned over on its side.

On the morning of the 21st a car in a freight train on the Kansas Central road ran off the track near Easton, Kan.

On the morning of the 22d a freight train on the Cairo & Vincennes road, having a circus on board, ran off the track near Mt. Carmel, Ill., and five cars were wrecked, injuring four men.

On the 27th a passenger train on the Richmond & Danville road ran off the track near Richmond, Va., and the engine went down the bank, killing the engineer.

On the morning of the 28th a freight train on the Philadelphia & Reading road ran off the track near Port Clinton, Pa., wrecking the engine and a number of cars. The wreck caught fire and several cars were burned up.

BOILER EXPLOSIONS.

On the night of the 23d the engine of a freight train on the Chicago, St. Louis & New Orleans road exploded its boiler at Vaughan, Miss. The engine was wrecked, the fireman killed, the engineer and conductor badly hurt.

OTHER ACCIDENTS.

On the afternoon of the 8th the engine of a passenger train on the Wabash road broke a connecting rod near Logansport, Ind., delaying the train some time.

This is a total of 76 accidents, whereby 22 persons were killed and 53 injured. In 14 accidents one or more persons were killed; 14 others caused injuries, but not death, while 48, or 63.2 per cent. of the whole number, there was no injury serious enough for record.

As compared with September, 1877, there was a decrease of 8 accidents, an increase of 2 in the number killed, and a decrease of 35 in that injured.

These accidents may be classified as to their nature and causes as follows:

COLLISIONS:		
Rear collisions	14	
Butting collisions	12	
Crossing collisions	1	
	—	27
DERAILMENTS:		
Unexplained	13	
Broken rail	1	
Broken wheel	1	
Broken axle	1	
Broken draw-head	1	
Spreading of rails	1	
Wash-out	11	
Land-slides	2	
Accidental obstruction	2	
Cattle on track	4	
Misplaced switch	5	
Open draw	1	
Rail maliciously removed	2	
Malicious obstruction	2	
	—	47
Boiler explosion	1	
Broken connecting rod	1	
	—	
Total		76

Three collisions were caused by trains breaking in two; two by mistakes in train orders; one each by a misplaced switch, by failure to use signals, by a runaway engine, by cars blown out of a siding, and by cars carelessly left on the main track. There were 10 accidents due directly to defects or failures of road or equipment.

Of the collisions five were between passenger trains, nine between a passenger and a freight, and 13 between freight trains; 16 derailments were of passenger and 31 of freight trains, and of the other accidents one was to a passenger and one to a freight train. The 27 collisions killed three and injured 21 persons; the 47 derailments killed 18 and injured 30, and the two other accidents killed one man and injured two.

Five cases of malicious derailment are reported, two by obstructions put on the track, two by removal of a rail and one by a misplaced switch. In the last named case parties are now on trial for the crime. Five accidents—one collision and four derailments—resulted from switches carelessly left wrong. The open draw is one of those cases which necessarily imply carelessness, either in showing or observing signals.

The number of butting collisions is unusually large; perhaps it may have resulted from the confusion caused by roads temporarily blocked by storms, as many were during the month. The month was made remarkable by its severe storms, and especially by that of the 11th, 12th and 13th, which spread over a wide expanse of country, but made itself most felt in Eastern Ohio and Western Pennsylvania, where the railroads of the Mahoning and Shenandoah Valleys were cut for days and enormous damage done. This storm was responsible for nearly all of the many wash-outs and land-slides recorded above, and probably for many minor accidents, which escaped record through the general confusion and the attention drawn to the more important and fatal ones. More of the deaths were caused by these wash-outs than by any other class of accidents.

For the year ending with September the record is as follows:

	No. of accidents.	Killed.	Injured.
October	82	31	112
November	83	23	70
December	66	8	26
January	75	23	77
February	67	8	31
March	49	5	14
April	46	12	55
May	50	13	44
June	56	12	58
July	54	7	41
August	75	36	108
September	76	22	53
Totals	779	200	689

The averages per day were, for the month, 2.53 accidents, 0.73 killed and 1.73 injured; for the year, 2.13 accidents, 0.55 killed and 1.89 injured. The average casualties per accident for the month were 0.289 killed and 0.697 injured; for the year they were 0.257 killed and 0.884 injured. The proportion of killed for the month was above, and that of injured below the average.

The Influence of the Distribution of Steam on the Efficiency of Steam Engines.

BY M. MARCEL DESPREZ, ENGINEER.

[Translated from the *Revue Industrielles des Mines*, by Prof. Robert H. Thurston.]

The excellent paper of M. Dwelshauvers-Dery, on "The Valve-gear of Steam Engines exhibited at Vienna," has determined me to make known the results of my studies of this subject.

What are the conditions which should be filled by a good system of steam-distribution? and, these conditions being given, what mechanism best accords with them?

Nearly all practical men who have considered this question agree that a perfect distribution should fulfil the following conditions:

1st. Admitting the steam exactly at the beginning of the stroke of the piston.

2d. Opening the steam-ports suddenly, and widely enough to permit the steam to enter at, as nearly as possible, boiler pressure.

3d. Closing the ports at any point in the stroke of piston, with the greatest possible rapidity and at the precise moment when the cut-off should take place, avoiding the throttling of the steam.

4th. Carrying the expansion to the end of stroke, avoiding premature exhaust.

5th. Opening the exhaust ports suddenly and holding them open throughout the return stroke of the piston, carefully avoiding compression.

A distribution which fulfills all these conditions to many seems to be the ideal of the class, and to attain this ideal they have shrunk from no degree of complication.

The latest system which has been devised to accomplish this end, a system which has produced among constructors a perfect infatuation, is that which is known as the "Corliss."

Let us exhibit, beside the conditions enunciated above, the distribution which is obtained with a simple slide-valve with lap moved by a circular eccentric or by any link-motion. We may distinguish in a distribution of this character six phases, which are:

Impelling Phases.	1. Admission.
	2. Expansion.
Forward stroke of piston.	3. Exhaust lead.
Resisting Phases.	4. Exhaust.
	5. Compression.
Return stroke.	6. Steam lead.

The mechanisms employed to give a distribution of this kind are certainly of extreme simplicity; they are also exclusively used in locomotives. Unfortunately, the majority of engineers and constructors consider the results that they give as very imperfect and regard them as incapable of giving a good utilization of steam; they are therefore excluded from engines which are called economical.

We will examine, one after the other, the working of a steam engine under a pressure of six atmospheres, absolutely without condensation, first with a perfect distribution of steam and then with a distribution effected by the link-motion.

I will assume that the piston of this engine has an area of one square meter and a stroke of one meter, and that the volume of each of its "dead spaces" is 0.05 of a cubic meter, or the twentieth of the volume swept through by the piston at each single stroke.

I will not make use of formulæ of thermodynamics, as they are too complex and as they do not give, under the conditions of ordinary practice, any better approximation than is obtained by the use of Marriotte's law. The latter approximates very nearly to the truth, as is shown by indicator diagrams taken from expansive steam engines.

I have assumed the pressure to be exactly 10,000 kilograms per square meter instead of 10,333 kilograms; it results from this that, in the determinations given hereafter, all numbers expressing quantities of work should be multiplied by 1.066, or, more simply, by $\frac{1}{15}$. This is of no importance. The object of the work being purely practical, in all my calculations I have preserved only the three first significant figures. Every one who has studied the theory of the steam engine knows, in fact, that the phenomena which occur in the interior of a steam cylinder are so complicated and so imperfectly known that it is impossible to obtain accuracy to within one per cent. of their numerical value. Thus, then, whether we apply the very long and very laborious methods of calculation of thermodynamics, or simply Marriotte's law, we obtain results which differ sensibly from the truth because no known theory enables us to take account of that exchange of heat which is continually going on between the metal of the cylinder and the steam.

Thus, Professor Zeuner, in his classic work on the mechanical theory of heat, after having exhibited, in the fullest detail, the method to be followed in the application of the principles of thermodynamics to the calculation of the work and the efficiency of the steam engine, concluded by showing that the formulæ of De Pambour give results equally exact. I shall take up this matter again in another work.

These preliminaries concluded, I give in Table A the work done in a steam engine with a distribution which is "perfect," *i. e.*, one fulfilling all the conditions enunciated in the beginning of this article. I assume that the fraction of the stroke during which the steam is admitted varies from 0.15 to 0.50. I repeat, first, that the piston in a single stroke sweeps through a volume of one cubic meter, and that the dead spaces amount to 0.05 cubic meter, or $\frac{1}{20}$ the volume traversed.

If, now, we make the same calculation for a perfect distribution in the ideal machine without dead spaces, we obtain Table B.

Now take the third case, that of an engine having 0.05 dead space, and in which the steam is distributed by a simple valve and the link-motion of Gooch or Allen, or by our own system, which will be presently described; the following are the elements of such a distribution as applied to a locomotive for express service:

Admission	0.15	0.20	0.25	0.30
Stroke of valve	72.5mm / 2.85 in.	74mm / 2.91 in.	76mm / 2.99 in.	79mm / 3.11 in.
Maximum opening	6.25mm / 0.24 in.	7mm / 0.28 in.	8mm / 0.31 in.	9.5mm / 0.37 in.
Compression	0.30	0.35	0.31	0.28
Back pressure	0.033	0.025	0.016	0.010
Admission	0.35	0.40	0.45	0.50
Stroke of valve	81.0mm / 3.21 in.	85mm / 3.35 in.	89mm / 3.54 in.	92.5mm / 3.64 in.
Maximum opening	10.7mm / 0.42 in.	12.5mm / 0.7 in.	14.5mm / 0.57 in.	16mm / 0.64 in.
Compression	0.25	0.225	0.195	0.175
Back pressure	.005	"	"	"

The outside lap is 30 millimeters = 1.2 inches.
The inside lap is 0.
The steam lead is 5 millimeters = 0.2 inch.
Steam lead is invariable.

At first glance, this distribution seems open to grave criticism if it is proposed to employ it when admitting steam during but a small fraction of the stroke of piston. If we take, as an example, an admission of 0.20, we find—

1st. That the opening of the ports is, at the maximum, but 7 millimeters, which should produce a considerable difference between the steam pressure in the valve-chest and that in the cylinder, *i. e.*, what engineers call throttling.

2d. When the piston has moved over 0.65 of its stroke, steam begins to escape into the atmosphere. It would seem *a priori* that we thus lose all the work that the steam should produce by its expansion through the remainder of the stroke.

3d. When the piston has completed 0.65 of its return stroke, the exhaust is closed and the steam, now at a pressure of one atmosphere, is compressed behind the piston. Its tension is thus raised more and more, or up to the time at which the admission again commences; there is thus work produced in resistance.

4th. The admission of steam, instead of commencing exactly when the piston is at the commencement of its stroke, begins when it has 0.03 of its return stroke still to make; this gives another amount of resistant work.

Such are the inconveniences common to all systems of distribution by the valve simply.*

Each of them seems serious enough to engineers and builders; so much the more does their combination in the distribution by the lap-valve lead them to consider the latter entirely inadmissible in economical engines.

I will examine each of these objections and calculate the amount of resisting work due to it and the impelling effort, also, in each of the phases of the distribution of a cut-off taking place at 0.20 the stroke. I will calculate the expense of steam corresponding to each.

1*st. Admission.*—At the beginning of the stroke of the piston, the ports are already open to a distance equal to the lead, say 5 millimeters. Again, the dead spaces are filled with steam in consequence of the compression and the steam lead. This fact is advantageous, as it causes the pressure of the steam in the cylinder at the beginning of the stroke to differ but slightly from the pressure in the valve-chest; it should be noted that the velocity of the piston is here zero. During the admission of steam the valve continues to open the steam port until the piston has made 0.024 of its stroke; at this instant, the opening has attained its maximum, which is 7 millimeters (0.028 inch); then the valve returns, gradually diminishing the opening of the port, until it is completely closed at 0.20 of the stroke.

It is essential, in order to understand what occurs, to trace closely the action of the valve and to observe the volume of the passage open to the steam just before closing. It is seen in the following table:

Distance of the piston from the beginning of the stroke in percentage of full stroke	15	16	17	18	19	20
Opening of the port	2.53mm / 0.10 in.	2.05mm / 0.08 in.	1.55mm / 0.06 in.	1.04mm / 0.04 in.	0.53mm / 0.02 in.	0.00mm / 0.00 in.
Speed of piston in percentage of speed at one-half stroke	71.4	73.3	75.1	76.8	78.4	80.1

We will now make a similar table for the Meyer system of

* These observations do not apply to the elliptic system devised by the author of this paper. That system permits us to obtain with a simple valve all the results which can be secured by the systems which include the double valve. It will be described hereafter.

distribution, in which the stroke of valve shall be relatively the same as that which we have under consideration; that is, about 74 millimeters (2.9 inches).†

We thus find

Distance of the piston from the beginning of the stroke, per cent.	15	16	17	18	19	20
Opening of the port	3.7mm 0.15 in.	2.96mm 0.12 in.	2.20mm 0.09 in.	1.48mm 0.06 in.	0.74mm 0.03 in.	0.00mm 0.00 in.

Opening at the beginning of stroke, 14.8mm = 0.6 in.

Finally, we give the data for the Farcot distribution, which is taken as one of the best, the stroke of the valve remaining the same.

Distance of the piston from the commencement of stroke	15	16	17	18	19	20
Port-opening, mm	2.30	2.50	1.80	1.20	0.60	0.00
" " inches	0.09	0.10	0.07	0.05	0.02	0.00

Thus, then, the two systems which are, with good reason, classed among the best double-valve arrangements, give a port opening hardly greater than that given by the single lap-valve near the point of closing; consequently, if these valve-gears do not throttle the steam, the lap-valve does not.

It should be noted that the throttling does not depend simply upon the port-opening, but more upon the speed of the piston.

If there were no difference of steam pressure between the valve-chest and the steam cylinder, the density of the steam would be the same in both, and it would follow that the volume of steam which must pass in a unit of time through the port would be equal to the volume swept through in the same time by the piston. Thus, if we call

l the length of port,
L the breadth of port,
A the area of piston,
v its velocity,
V the rate of flow of the steam,

we would have, on the supposition that the steam has the same pressure before and behind the port, and consequently the same density,

$$V L l = A v \text{; and } V = \frac{A v}{L l}.$$

We find that, on this supposition, the velocity of the steam proportiontal to the ratio $\frac{v}{l}$; that is, to the ratio of the speed of piston to the port-opening at the given time.

Now if we calculate this ratio, or, what is the same thing, a ratio in which v is replaced by a quantity which is proportional to it, we have for the simple valve:

Distance of the piston from the commencement of stroke, per cent.	15	16	17	18	19	20
Ratio $\frac{v}{l}$	0.28	0.36	0.48	0.74	1.48	8
Square of $\frac{v}{l}$, or $\frac{v^2}{l^2}$	0.08	0.13	0.23	0.55	2.20	8

I have entered in the third line the values of $\frac{v^2}{l^2}$ because we may take the difference of pressure between the cylinder and the valve-chest as proportional to this ratio under the hypothesis assumed, *i. e.*, supposing the density of the steam to differ but little above and below the port.

Now, if we take as unity the value of $\frac{v^2}{l^2}$ corresponding to 0.19 of the stroke of the piston, that is to say, at the point from which the piston has but 0.01 of its stroke to make before the valve completely closes the port, we finally obtain the following:

Distance of the piston from the commencement of stroke, per cent.	15	16	17	18	19	20
Values of $\frac{l^2}{v^2}$ or relative loss of pressure	0.036	0.06	0.10	0.25	1.0	∞

We see, therefore, and it is this which I wish to prove, that the loss of pressure decreases in an extraordinary ratio, as we depart from the point at which closing is completed, as, when the piston has moved through 0.17 of its stroke, this loss is one-tenth as great as when it has moved 0.19.

These considerations show plainly that the difference of pressure, called throttling, or "wire-drawing," depends on the passage open to the steam at the instant before complete cut-off, and that, in this respect, these several systems of distribution exhibit insignificant differences.

The only truly effective method of increasing the area of opening, were it necessary to do so, consists in the adoption of valves having several openings like those of Frick, of Hanrez, etc. Frick's valve is used on many locomotives in Germany and in England. It gives a double area of port without being larger or more complicated than the common valve, and it is surprising that it is not more generally adopted.

Diagrams taken from engines having a distribution by a double valve show that the pressure of the steam in the cylinder is maintained very nearly equal to that of the steam in the valve-chest, nearly up to the point at which the port is completely closed. The reasoning given above shows that we may obtain the same result with a distribution effected with a simple valve. This is completely confirmed by experiment. In fact, in all the diagrams taken from English locomotives at low speed, we find that the pressure remains uniform during admission almost up to the point of complete closing of the port, the speed being from 50 to 60 revolutions a minute.

I have myself taken a large number of diagrams from engines fitted with my system of simple valve-gear, and I have always found that, at ordinary speeds of 50 or 60 revolutions a minute (the stroke of piston being 0.75 meter = 29 inches), the pressure of steam remained uniform throughout the admission, and that the deflection only became sensible when the piston had but two or three per cent. of its stroke to make before the closing of the port occurred. We find, indeed, in this respect, surprising results, proving that the steam assumes, while traversing the ports, velocities very much greater than those which are indicated by the formulæ usually employed, considering the slight difference in pressure due to its flow.

When, however, the velocity of piston becomes very great, as in locomotives making 150 or 200 revolutions a minute, or more, the pressure is constant during but a very brief period, and that part of the diagram which corresponds to the admission runs into the expansion-line, properly so called. But this occurs, also, with double valves, since the velocity with which they close the port is sensibly the same as that of the simple valve. This, then, would be the case in which it would be proper to use the valve with multiple openings. But does this gradual loss of pressure present a serious disadvantage in an economical point of view?

This is indeed one of those questions that every one answers at once, while it is one of the most difficult to determine; it is certain that, considered apart from all the accessory phenomena accompanying it in the steam engine, such as the entrainment of water, the conductivity of the surface of the cylinder, etc., it produces a loss of useful effect; but, even then, is this loss considerable? I think not; and the opposite opinion, circulated by engineers, arises from their involuntary assumption that steam is an incompressible fluid, like water, in which the losses of pressure due to friction, to the small size of orifices through which they flow, etc., cause proportional losses of useful effect.

But it is quite different with steam, a fluid which is elastic and of which the density diminishes with the pressure and which possesses the property of retaining practically constant its initial temperature when expanding into a larger space without doing external work.

It follows, in fact, from the experiments of M. Hirn, that saturated steam having a pressure of five atmospheres and a temperature of 155° C. (311° F.), falls to a pressure of one atmosphere and a temperature of 140° C. (234° F.) when it flows freely into the atmosphere; its temperature is, then, after expansion, 40° C. (104° F.) higher than that which it would have if it were saturated. Thus it happens that steam, compelled to take a higher velocity in passing through narrow orifices, before its arrival in the cylinder, has, in the cylinder, a temperature very considerably higher than that which corresponds to its point of saturation; that it is, in fact, superheated. Now superheated steam has a great superiority over saturated steam. This superiority is not due to the insignificant diminution of density which results from the superheating, but to the fact that superheated steam yields its heat to the walls of the cylinder much less readily than saturated steam. Superheating would not increase sensibly the efficiency of an engine having a cylinder incapable of conducting heat; but such a cylinder is not obtainable, and we have no other means of reducing the considerable loss of energy which is caused by the continual transfer of heat between the walls of the cylinder and the steam than to reduce as much as possible the power of the steam to give up its heat; that is to say, to superheat.

It follows from what has been stated that, in certain cases, the wire-drawing will be far less objectionable than it is usually considered.

I will now, to conclude the discussion, give here the figures obtained by M. Hirn, in his beautiful experiments on single-cylinder engines with variable expansion, working with superheated steam. The external work measured by the brake was constant.

Boiler pressure, atmospheres	4.5	4.5	4.5
Superheat	92°0 197.6 F.	92°0 197.6 F.	0. 0.
Point of cut-off, per cent	20	87	Nearly full stroke.
External work, measured by brake	150 H.P.	150 H.P.	150 H.P.
Weight of steam per second	0.345 kil. 0.759 lb.	0.411 kil. 0.904 lb.	0.469 kil. 1.032 lbs.
Work of one kilogram of steam in kilogrammeters	32.300	27.400	24.000
Do. of 1 lb. in ft.-lbs	106.928	79.872	78.720

In the experiments corresponding to the last two columns, the induction valve was partly closed, while the period of admission was lengthened. We see that, in the last two cases, the economical efficiency is very much higher than would have been anticipated. Finally, the advantage of the greatest expansion, to five times the initial volume, is not nearly as great as is generally believed. But the consideration of this point belongs to a succeeding article. We will now resume the discussion which has been already entered upon.

1st. When the ports are completely closed at 0.5 the stroke, the dimensions of the passages open to the steam when the piston reaches 0.19, 0.13, etc., of the stroke, are sensibly the same for the distributions effected by the simple valve and those obtained by the use of the double-valve. Their area may be doubled by the employment of the Trick or the Allen valve, which are as simple as the ordinary lap valve.

2d. It follows that the throttling, or wire-drawing, of steam is equal in the two kinds of apparatus, and that it is very little when the engine moves at the ordinary rates of speed. This is fully confirmed by the diagrams, provided that the steam is given a certain amount of lead.

3d. But when the velocity becomes very great, as in the locomotive, the pressure no longer remains constant during admission; it falls more and more until the port is completely closed. The steam pressure in the cylinder at the commencement of the expansion may then become very much lower in the boiler. But this is not true of its temperature, and the steam inclosed in the cylinder may be found superheated, especially if it was dry when coming from the boiler. The consequence of this condition, in which the properties of superheated steam are acquired, is that in certain cases, particularly those in which the cylinder is not well protected against cooling and wet steam, working with wire-drawn steam may be *more economical* than working without throttling.

Finally, the experiments of M. Hirn have shown that, even with a loss, when the wire-drawing is carried to an extreme, the economical efficiency is much less affected than is generally supposed.

It should be added that the effect of wire-drawing is not the same, whether produced by the throttle valve or by the slide, especially in condensing engines. It is of greatest advantage when produced by the slide.

[TO BE CONTINUED.

† The Meyer system of valve-gear consists of a three-ported slide, having an expansion-valve on the back moved by an independent eccentric.—*Translator.*

Death of Mr. Benjamin H. Latrobe.

Mr. Benjamin H. Latrobe, one of the most distinguished engineers of America, died at his home in Baltimore, No. 146 North Charles street, at 5:30 a. m., Saturday, Oct. 19, surrounded by his whole family, his wife, his two sons, Rev. Benj. H. Latrobe, Jr., and the well-known bridge-engineer, Mr. Charles H. Latrobe, his three daughters, his brother, John H. B. Latrobe, the eminent lawyer, a sister, and his nephew, the Mayor of Baltimore. The following imperfect sketch of his life we take from the Baltimore *Gazette* of Oct. 21:

Benjamin H. Latrobe was born in Baltimore in 1807, his father being Benjamin H. Latrobe, Sr., one of the most skilled architects of his time. Among his most famous works are the national capitol buildings at Washington, the Roman Catholic Cathedral and the exchange building of this city. The deceased was educated for the bar, having begun the study of law after his graduation from St. Mary's College, in his 18th year, and his brother, Mr. John H. B. Latrobe, Sr., entered the Military Academy at West Point, where he stood well in all his classes. Their father having been called to New Orleans, La., about 40 years ago to superintend the construction of the waterworks there, was attacked with yellow fever and died. Mr. John H. B. Latrobe then left West Point and began the study of law, in which he has since attained great eminence. The subject of this sketch, who had always had a decided talent for mathematics, finding the study of law distasteful, abandoned it and began to prepare himself for civil engineering under Mr. Jonathan Knight, at that time Chief Engineer of the Baltimore & Ohio Railroad. In 1831, the talent of the young man having won the favor of Mr. Knight, who recommended him highly to the officers of the road, he was appointed Assistant Engineer. Soon afterward he was made chief of the corps of engineers, and finally became Chief Engineer of the company.

Mr. John H. B. Latrobe then occupied the position of Chief Counselor for the company, and the two brothers were thus called upon to play a most important part in this great Baltimore enterprise, each of them combining in their separate persons a most valuable acquaintance with both law and engineering. It was under the supervision of the deceased that the Baltimore & Ohio Railroad was extended to Cumberland River, and in 1853 he began and afterward successfully completed the branch road from Cumberland to Wheeling. The difficulties of both these enterprises were in those days thought to be almost insurmountable, and it was largely due to the skill, energy and perseverance of Mr. Latrobe that they were finally overcome and the road carried through the wild fastnesses of the great Alleghenies. He was also Chief Engineer of the Pittsburgh & Connellsville Railroad, and after its completion became its President, in which position he displayed rare administrative ability. The Washington Branch was also built under his supervision and the massive viaduct over the Patapsco at the Relay stands to-day a beautiful monument to his engineering skill. After holding the position of Chief Engineer for 21 years under the successive administrations of Louis McLane, Thomas Swann and W. G. Harrison, Mr. Latrobe resigned soon after the election of Mr. John W. Garrett, but up to the time of his illness was frequently consulted in regard to the working of the road. The city authorities also had occasion for his services in regard to the Jones' Falls improvements, and in August last he was requested by Mayor Latrobe to give his opinion upon the best means of remedying the basin nuisance. His illness prevented his acceding to the request. In private life the deceased was a modest and unobtrusive man and a courteous but genial gentleman. During the civil war he was an earnest member of the Union party.

The funeral took place yesterday afternoon from Emanuel Protestant Episcopal Church, corner Reade and Cathedral streets, Rev. Dr. A. M. Randolph officiating, assisted by Rev. C. J. Holt. The attendance was very large. The remains were inclosed in a handsome casket, covered with black cloth. Upon the top was a massive silver plate, with the inscription, "B. H. Latrobe, died 19th of October, 1878, aged 71." The pall-bearers were William Keyser, vice-president, and William G. Harrison, ex-president of the Baltimore & Ohio Railroad; Dr. J. P. Thom, Dr. Richard McSherry, Lawrason Riggs, Charles P. Manning, Colonel Mendes Cohen and Dr. Carey B. Gamble. Dr. Randolph made a brief address at the church, in which he spoke eloquently of the integrity and genial candor of the deceased, and of his pure and noble life. The interment took place in the family lot at Greenmount.

Long Service of Conductors.

The Springfield (Mass.) *Republican* says: "The 7:15 a. m. train for Boston has been run ever since the road opened, or about 40 years, with only one change of conductors. James Parker, the first conductor, ran it 29 years, and John Clarke, his successor, finished his tenth year with the train last Saturday."

Prices of Rails.

Though the steel works are all busy now, they are said not to have many orders for winter delivery, and buyers are trying to secure a concession in prices for such orders—offering at Eastern mills $42 to $42.50 per ton, which the manufacturers are disinclined to accept, though they will probably take less than they have got for summer and fall deliveries—say $44 to $45 per ton.

The demand for iron rails is said to be considerably more active, and so much so as to have caused an advance of about $1.50 per ton. Quotations are $33 to $36 at Pennsylvania mills.

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EDITORIAL ANNOUNCEMENTS.

Passes.—*All persons connected with this paper are forbidden to ask for passes under any circumstances, and we will be thankful to have any act of the kind reported to this office.*

Addresses.—*Business letters should be addressed and drafts made payable to* THE RAILROAD GAZETTE. *Communications for the attention of the Editors should be addressed* EDITOR RAILROAD GAZETTE.

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

THE GROWTH OF TRAFFIC.

The new Chief of the Bureau of Statistics, Mr. Joseph Nimmo, Jr., promoted from the division of Internal Commerce, has recently made several interesting contributions to popular statistical information, in some of which he has made special use of statistics of transportation.

If we could have tolerably complete statistics of transportation, they would doubtless form an excellent key to the statistics of production, and, in connection with other more easily ascertainable facts, would give a good basis for a judgment of the industrial activity and general prosperity on the country. And if the statistics only included a comparatively few staples, they would still be very valuable. Indeed, what few we have, as of cotton, grain, petroleum, anthracite coal and a few other things, are very valuable by themselves and and go far toward determining the opinion of business men concerning the condition of the country. Suppose, now, we had complete statistics of coal production—not simply the statistics of a few leading fields, or more complete statistics gathered a year or two after the time to which they apply, but statistics of all coal production in the country, reported weekly or monthly, not more than a few days or weeks late—this alone would go far toward determining the condition of manufacturing industries. Now, we have reports of little more than half the coal production, probably, omitting the chief sources of supply of nearly three-fourths of the population of the country, though this is not by any means the chief manufacturing population.

But statistics of transportation are apt to be misleading unless they are complete. Suppose, for instance, the grain shipments of the Erie Canal should be taken as a guide to the shipments of the grain from the Northwest to the East. There was a time when these would have been a very fair criterion of the business, not measuring it exactly, but being nearly in proportion to it. But how erroneous it would be to take this for a guide to the business of recent years. From 1871 to 1876 the movement by the canal fell from 52,500,000 to 33,000,000 bushels; yet in the same time the seaboard receipts increased from 159,000,000 to 212,000,000 bushels. Then from 1876 to 1877 while the general movement decreased from 212 to 201 millions, the canal movement increased from 33 to 48 millions. We are liable to gross errors if we take only one route or group of routes, or one field of production out of several.

Mr. Nimmo's figures for transportation were intended chiefly to give some evidence of the degree of industrial activity, rather than of the amount of transportation. To give the "amount of traffic" on a railroad he gives the number of tons of freight shipped on it, which is a most imperfect measure of the amount of transportation, and may or may not be of the amount of production of the country served by the road. The only true key to the amount of transportation is the tonnage mileage; that of the amount of production (so far as ascertainable from transportation), the quantities shipped at the place of production, or, in the only way the transportation lines could distinguish them, the quantities loaded into cars at the stations. In the matter of transportation, the number of tons hauled may be changed altogether by some petty accident which may not affect in the slightest degree either the quantity produced or the amount of transportation. Suppose, for instance, it should become desirable that the Reading Railroad should, in bringing its coal into Philadelphia, use the Pennsylvania Railroad track for ten miles instead of its own. Then in the report of number of tons hauled, all the Reading coal tonnage might be made to appear twice, once on each road, while before it had appeared but once. And, which is a common enough event, in case several roads forming a continuous line are united in the possession of one company, the million tons of through freight which passes over the whole line then counts but one million, while before it counted for as many millions as there were different owners in the line.

On this account tonnage mileage, the accurate measure of the amount of transportation, is also likely to be more accurate than bare tonnage as a measure of commerce and production. It is true that the freight may go longer distances one year than another; and in taking all kinds of freight together there is room for a considerable error on this account; but when separate articles are taken, there are not likely to be great changes from one year to another in the average distances hauled over the same road.

Mr. Nimmo adduced tonnages from 1873 to 1877 on a number of different roads as evidence of the growth of business in the country. Two of these are trunk lines—the New York Central and the Pennsylvania—besides the statement of through tonnage over the Baltimore & Ohio, which is all that is given by that company. Two are immediate connections of the trunk lines, whose through traffic is largely the same as that of the trunk lines—the Lake Shore & Michigan Southern and the Pittsburgh, Fort Wayne & Chicago. Two are Northwestern roads—the Chicago & Northwestern and the Chicago, Rock Island & Pacific—and the other is the exceptionally situated Union Pacific.

Only the two Northwestern roads are lines on which the tonnage shipped is likely to have been chiefly either direct from the producer or to the first consumer, or to any great extent a key to production or even to the total transportation movement of the country. The freight over the four roads between New York and Chicago is very largely a transit freight, not produced on any of the lines carrying it, and moreover, all of it that was through freight was carried in competition with other lines, not only railroads, but lake and canal boats, so that it is readily conceivable that a growth of traffic on them did not represent any growth in aggregate production and transportaion, but simply a transfer from one route to others. And in fact this doubtless was true in some of the years. The trunk lines carried more than ever before in seasons when the total traffic was smaller rather than larger than usual, having increased their business at the expense of the lakes and canal.

In the spring of 1877 Mr. John Cooke, President of the Danforth Locomotive Works, read before the Paterson Board of Trade the result of investigations made by him in behalf of the locomotive works for the very practical purpose of ascertaining the prospects for the future demand for locomotives. He used for this purpose statistics of passenger and tonnage mileage over the three trunk lines that report, obtained from this office, which showed, on the whole, a substantially stationary passenger traffic since 1873, and an increase in freight traffic of 17½ per cent. from 1873 to 1876 on these three roads. And he further illustrated the course of the traffic by comparing the growth of freight business on the New York Central before and after 1873, showing that where there was an increase of 27 per cent. from 1873 to 1876, there had been an increase of 66 per cent. from 1870 to 1873, and of 80 per cent. from 1867 to 1870. That is, there has been considerable growth since 1873, though slow in comparison with the tremendous rate of progress for several years before that.

For the purpose then in view, that is, the ascertainment of the work done on railroads, this was a correct procedure. The demand for locomotives depends largely on the amount of traffic hauled by rail, and would be promoted by the drying up of the lakes and Erie Canal, though the aggregate production and transportation of the country would be diminished thereby.

That the number of tons hauled is a very imperfect clue to the amount of freight transportation is shown at once by a comparison of tons hauled with tonnage mileage on these trunk lines.

Bringing down the figures a year later than in Mr. Cooke's report (which was published on page 220 of the last volume of the *Railroad Gazette* (May 18, 1877), we find that while from 1873 to 1877 the tons handled increased only from 22,264,275 to 22,972,201, or 3.2 per cent., the tonnage mileage increased from 3,695,000,000 to 4,229,000,000, or 14.4 per cent., the average haul on these three roads being 166 miles in 1873 and 184 in 1877. And this indicates the special feature of freight transportation on the lines between the East and the West since 1873, that is, a great increase in through freight, gained chiefly by diverting it from the water routes by a reduction of rates to cost or less, and on the other hand little or no growth in local traffic, significant of stagnancy in industrial enterprises along the roads.

A much fuller exhibition of the progress of traffic since 1873 than has been given before we have compiled and present below, the figures indicating millions of ton-miles. In the first group we give the trunk lines, the Grand Trunk not being included in the totals, because the figures are only for the last half of each year for this road:

Trunk Line Tonnage-Mileage for Five Years:

	1873.	1874.	1875.	1876.	1877.
New York Central	1,277.5	1,391.6	1,404.0	1,674.5	1,619.9
Erie	1,033.0	1,047.4	1,016.6	1,040.4	1,114.6
Pennsylvania	1,384.8	1,372.7	1,479.4	1,629.7	1,494.8
Three roads	3,695.3	3,811.7	3,900.0	4,344.6	4,229.3
Grand Trunk	238.8	332.1	342.7	377.2	435.4

If now we compare the traffic of the first year with that of the last of the five for all the road, we shall be able to see their rates of progress. Below, where we have done this, we have given the percentages of increase in the number of tons hauled by the side of the percentages of increase in ton-miles, to illustrate what we have said heretofore:

	—Increase from 1873 to 1877 in— Ton-miles.	No. of tons.
New York Central	27.0 p. c.	6.7 p. c.
Erie	7.9 p. c.	(Dec.) 2.1 p. c.
Pennsylvania	7.9 p. c.	4.4 p. c.
Three trunk lines	14.4 p. c.	3.2 p. c.
Grand Trunk	82.4 p. c.	39.0 p. c.

This shows not only what the increase has been, but where it has been. Excluding the Grand Trunk, whose returns of ton-miles are for but half of each year, it appears that of an increase of 534 millions of ton-miles made on three trunk lines from 1873 to 1877, no less than 342 millions, or nearly two-thirds, was on the New York Central; but evidently we get a very imperfect idea of the course of trunk-line traffic by excluding the Grand Trunk, whose rate of increase has been much more rapid than that of any of the other three roads, so much so that if the progress in the first halves of the years has been at all comparable to that in the second halves, the amount of its increase must have been as great as the enormous one on the New York Central. And we have a further deficiency, which is doubtless a great one, in the absence of reports for the Baltimore & Ohio. Its through traffic, we know, has increased enormously; the number of tons carried through over the main line being 1,047,645 in 1877 against 640,265 in 1873—an increase of 63½ per cent., equivalent to about 153 millions of ton-miles over this road; which may, however, be greater than the total increase in tonnage-mileage over the road, as the local traffic may have decreased. But the Grand Trunk increase has probably been almost wholly in through traffic, as that of the other roads has been mostly and very likely wholly. And it is noticeable that the northernmost and the southernmost of the roads carrying trunk-line traffic have made the greatest progress in increasing their share of it since 1873; for, though we do not know what the total traffic of the Baltimore & Ohio has been, we know that it has never been so great as that of either of the other three American lines, while its increase appears to

have been greater than that of any of them except the New York Central's, and in proportion to its traffic, greater even than that road's.

Let us now turn to another group of roads, the immediate western connections of the trunk lines, from which the latter receive nearly all their through east-bound traffic except that brought by lake steamers. They are situated much like the trunk lines so far as through traffic is concerned, and get the same rates per mile for it; but there are more of them, causing a greater diffusion of the traffic, and, what is often of great importance and much to the disadvantage of the western connections, *they compete with the lakes where the trunk lines compete with the Erie Canal.* The difference may be appreciated by the fact that at this moment the rate on wheat by lake from Chicago to Buffalo, 520 miles of rail distance, is 3 cents per bushel; while by canal from Buffalo to New York, 440 miles of rail distance, the rate is 8 cents per bushel. And the lake steamers are very much more effective competitors for merchandise freights than any canal boats, and are used largely as connections of the trunk lines.

We have compiled a statement of both tonnage and tonnage-mileage for most of these roads, with their western termini at Chicago, Indianapolis and Cincinnati, from which we give the following:

Tonnage-Mileage of Western Connections of Trunk Lines for Five Years.

	1873.	1874.	1875.	1876.	1877.
Michigan Central... ...	246.1	313.4	318.4	396.0	473.8
Lake Shore & Mich. So.	1,053.9	909.3	943.2	1,133.8	1,080.0
Atlantic & Gt. Western.	311.0	319.3	282.7	293.4	337.4
Cleve., Col., Cin. & Ind.	270.3	264.2	263.3	311.8	275.7
Pitts. Ft. Wayne & Chicago	474.9	462.9	491.3	567.6	440.0
Pitts., Cin. & St. L.....	205.5	204.4	207.5	250.0	236.7
Six roads.....	2,561.7	2,563.5	2,506.4	2,952.6	2,843.6

The percentages of increase, in number of tons as well as tonnage mileage, have been, from 1873 to 1877:

	—Increase from 1873 to 1877 in— Ton-miles.	No. of tons.
Michigan Central.....	96.5 p. c.	115.6 p. c.
Lake Shore & Michigan Southern.....	2.5 "	6.5 "
Atlantic & Great Western...	8.5 "	7.7 "
Cleveland, Columbus, Cincinnati & Indianapolis	2.0 "	Dec. 3.4 "
Pittsburgh, Fort Wayne & Chicago.....	Dec. 7.4 "	16.1 "
Pittsburgh, Cincinnati & St. Louis.....	15.2 "	17.0 "
Six roads.	11.0 p. c.	18.7 p. c.

Some remarkable facts are here exhibited. The great increase on the Michigan Central, to be sure, is made to appear greater than it actually has been from the fact that until 1876 only the traffic of the main and air lines was reported. But this does not make so great a difference as might be thought, for the traffic of all the lines in 1876 is but one-fourth greater than the traffic of the main and air lines in 1875, and probably not a fifth of the total is chargeable to the branches of this road in the last year, and, granting this, the increase from 1873 has still been 54 per cent. Most remarkable of all is the vast decrease on the Pittsburgh, Fort Wayne & Chicago from 1876 to 1877—about 22½ per cent., bringing it below the traffic of 1873 even—a change that we were not able to believe until we had verified the traffic by dividing freight receipts in both years by the average rates per ton per mile. It is the more astonishing as the number of tons increased the year that there was so terrible a decrease in the tonnage-mileage, the figures indicating an average haul of 164 miles in 1877 against 216 in 1876. It indicates that this road gave up its through traffic in 1877 to a great extent, and we understand that this was the case, the Pennsylvania Railroad not having made in 1876 the yearly contracts at low rates under which most of the through traffic was carried in the first half of 1877.

But, taking the six roads together, their traffic has increased 11 per cent. in the five years, and, what is remarkable, their increase in the number of tons hauled has been much greater—18.7 per cent. That is, the number of short hauls has increased faster than the number of long ones, so that the average haul, which was 172 miles in 1873, had fallen to 163 miles in 1877—a change exactly the opposite of that which has taken place on the three trunk lines, where the average haul increased from 166 to 184 miles from 1873 to 1877.

The culminating period for nearly all the roads seems to have been the year 1876—the first in which the railroads competed seriously and successfully with the lakes for the grain traffic. The exception in the case of the Michigan Central is more apparent than real, as its year "1877" ended with May of that year, and so included seven months of 1876.

Should we exclude the Michigan Central, whose returns for the first three years do not include all its traffic, we would have for the other five roads, taken together, very little difference between the traffics of 1873 and 1877, the former being 2,315.6 and the latter 2,369.8 millions of ton-miles.

There is needed to complete the view of the traffic of this great intermediate district between the East and the West little more than an account of the freight of the Great Western of Canada, and that on the lines of the Baltimore & Ohio Railroad west of the Ohio, which it does not report. Its through traffic having been largely created since 1873, it is probable that the growth of traffic on these lines has been considerably more rapid than the average.

The Value of Through Freight Traffic.

A Mr. Alexander McEwen, of Scotland, who has heretofore sometimes been somewhat prominent in discussions concerning the Grand Trunk Railway, recently addressed a circular to the stockholders of that road in which he proposed deliberately to give up the through traffic of the road as unprofitable. About one-eighth of the stocks joined with him in a request to the directors for a committee to investigate the question of the unprofitableness of the through traffic. The result has been a communication from Sir Henry Tyler, the President of the company, in which, however, he does not say whether or no the through traffic is or ever has been unprofitable, but copies from his speech at the last half-yearly meeting the extremely interesting statement of the actual average rates received on *all* freight in six successive years (decreasing from 1.44 cents per ton per mile in 1873 to 0.75 cent in 1876, and advancing to 0.80 cent in 1878), and states that long ago the directors instructed the officers of the road not to carry at a loss. As it is to be presumed that the officers obeyed these instructions (which, however, it is very difficult to do sometimes), and as the road has, we believe, very seldom refused freight, and as through rates by this road for most of the current year (say until the middle of August) on the coarsest east-bound freights have been from 0.2 to 0.4 cent. per ton per mile, it would appear that the cost of transportation on the Grand Trunk Railway is estimated very low. We do not know how much the Grand Trunk has taken at such rates, but we do know that some other railroads last summer carried grain and flour at rates that yielded them but 0.26 cent per ton per mile, and the Grand Trunk's line for that traffic is longer, and at the same rate would yield less per mile hauled; and it has been openly confessed—that is the proper term—that this rate was not so low by a fifth as that by which a large amount of freight was taken. We shrewdly suspect that there is no road engaged in the through traffic between the West and the East that has not carried for a good deal less than cost this year and last and the year before; and if an accurate account were made of this year's east-bound traffic, we are confident that it would show a very large balance on the wrong side of the ledger, in spite of the heavy traffic all the year and the improved rates since the middle of August. But the Grand Trunk people are probably not especially to blame. It is not so easy or safe a matter to refuse traffic because it produces a loss, when a company is fully equipped for taking it. The refusal of the business will not enable it to save all the expenses properly connected with it unless it is abandoned for all time—and not then always. If rates are below cost in July, and I lay by my trains, but keep up my staff and equipment in anticipation of profitable rates in August or September or next year, I will probably not save as much as what I would have received at the unprofitably low rates. A railroad is like an army, it costs whether it fights or rests, whether it advances or retreats.

But in these cases of justifiable carrying at less than cost there must be something to look forward to. Unless the prospect is that the through or other business carried for the time at less than cost will in the future be, on the average, a profitable business, surely it is not worth while to spend money to preserve the machinery for doing it. And for some years past through traffic has been on the whole so unprofitable, especially for the roads which belong to the longest routes, are for any reason more costly to work, or have to accept lower average rates than their rivals, that it is not strange that some should be seriously disposed to abandon it, not only as for the moment unprofitable, but hopeless. And it is not impossible that this will be the best policy for some companies, even if the railroads succeed in making a stable combination and in maintaining rates. For no possible combination will hereafter be able to maintain high through rates, especially on east-bound freight. The competition of water routes effectually prevents this, and the water routes are becoming more and more effective. The improvement of the mouth of the Mississippi may do something, but probably nothing like as much as has been effected by the introduction of larger vessels on the lakes, and a great deal more is at least possible from the enlarged Welland and St. Lawrence canals. Pretty soon propellers of good size will be able to take their cargoes directly and in short time from Chicago to Montreal, and that will make it forever impossible to get high rates by rail on grain and provisions, unless where there may chance to be a pressure of demand in the winter. Very likely the railroads may get a good traffic, and those favorably situated make a profit on it; but the prospect is that the margin of profit on east-bound freight hereafter will be but narrow under the most favorable circumstances, and the roads which carry it at a disadvantage may find it best to give it up, or at least decline making great sacrifices to preserve it.

The Central Association of General Ticket and Passenger Agents.

This new Association, which was organized in Chicago at a meeting on the 10th and 11th inst. is intended to do the work within its district which hitherto the General Ticket and Passenger Agents' Association has done, though only a part of the members of the latter were interested in or took any part in the business. It is, in fact, an application of "decentralization" and "local self-government." The railroad system has grown too big for one association to attend to properly without great waste of time. There is already a New England Association; and most of the questions which arise among the officers of the passenger departments affect groups of roads only, and not the whole system. The organization of local associations was recommended at the September convention of the National Association, which continues to have its proper field of activity. The Central Association, however, has an enormous field, including all north of the Ohio River, west of Pittsburgh, Salamanca, Buffalo, Niagara Falls and Toronto (trunk line termini) and east of the Mississippi, together with Minnesota west of the Mississippi, in which there are more than 26,000 miles of railroad, or about one-third of the total in operation in the United States.

The Association is intended to have exactly the same kind of authority as the National Association, that is, it is required that the members shall have credentials from their companies authorizing them to act for and bind their companies "in making rates and divisions for the transportation of passengers and baggage, and the adoption of rules and regulations for the execution of the foregoing powers." The following rules concerning making rates are prescribed by Section 7 of the by-laws:

"First—Passenger rates shall be fixed in open meeting.

"Second—The right to make through rates between common points shall be accorded to the company or companies having the shortest line between said points, provided that the computation of distance shall be made by the usual route over which through tickets are regularly sold and trains run in connection; and provided further, that when a water route forms part of such line, and is in competition with a rail line, the rates of the rail line shall be adopted in making the through rate; provided that such through rate shall not exceed the sum of the locals of any rail line between such points."

The chief object of this first meeting was the organization of the Association. It found time, however, to discuss the subject of free and excess baggage, and passed resolutions in favor of a universal rule on all railroads in the country granting free transportation of 150 lbs. of baggage for all full tickets and 75 lbs. for each half ticket, all excess to be charged for at regular agreed rates, applying to local and through traffic alike; and this policy it would have adopted on the first of January next.

The Association also adopted the following resolution:

"*Resolved*, That it is the sense of this Association that all roads represented in it should agree to take off sale and out of the hands of any agents or other persons off of the line of their respective roads or outside of their regularly authorized and salaried local officers, any of their issues of tickets or ticket-orders of any kind or nature, except where roads may request their connections to furnish such tickets to take effect blank date, and that thereafter no such tickets or orders shall be placed on sale by any associate line, in competition directly or indirectly with any other associate line, without notice in meeting is first sent to the Secretary of this Association, for action at the next meeting, and also to the competitive associate line interested."

The constitution of this Association does not prescribe any regular times for the holding of meetings. The time can be fixed at each meeting, or on application of any five members, stating time, place and object, the Secretary must call a meeting at any time, giving five days' notice. The next one will be at the Grand Pacific Hotel, Chicago, Nov. 13.

The Late Benjamin H. Latrobe.

The death of Mr. Benjamin H. Latrobe, full of years and honors as he was, is a national loss, and will be a cause of sincere mourning in the ranks of the engineering profession, of which he was one of the brightest ornaments. For Mr. Latrobe had not only that professional skill which made his services in demand and commanded the professional admiration of engineers and railroad men, but he displayed a loftiness of character and a kindliness of heart which made him even more admirable as a man than as an engineer, and secured him reverence and affection as well as respect. Proud of his profession and ambitious of reputation in it, he was still most generous in awarding credit to others, and magnanimous in his appreciation of the work of contemporaries engaged in the same field. His active life was contemporary with the rise and development of American railroads, in which, indeed, he was a leading actor, and for most of this time he has been looked up to as one of the ablest of railroad engineers. Thus, a very large proportion of the problems which arise in railroad construction came to him as difficulties without precedent, for which he had to provide original solutions. He was one of the pioneers who cleared the path for the present generation of railroad builders, and cleared it so well that they can hardly appreciate how rough and hard the way was to him and his contemporaries

—that generation of railroad men who had no predecessors, and who yet did their work so well that most now think to deserve credit when they succeed in imitating it tolerably.

The readers of the *Railroad Gazette* have special cause for mourning the death of Mr. Latrobe. He was one of the earliest contributors to its columns, and he has given its readers some of the most valuable chapters in the history of railroads in his sketch of the history of the "Grasshopper" locomotive, and especially in his account of the working of the 10 per cent. grade on the temporary track over the Kingwood tunnel during the construction of the Baltimore & Ohio Railroad—a performance without example in the history of railroads, and now generally accepted the world over as the maximum grade worked, or workable, by adhesion.

But they have other cause for regret. Mr. Latrobe was intending to prepare for these columns a more extended historical treatise, for which the experience of his life gave him peculiar qualifications, and which would, doubtless, if he had been spared to complete it as he desired, have been one of the most valuable contributions ever made to the history of railroads, nearly every step in the development of which had been made under his personal and careful observation, and many a one under his direction. This seemed a work peculiarly fitted for his declining years, when, resting from active labors, he found enjoyment in the contemplation of his long and rich experience, and the heartiest appreciation of his fellows for his narration of it. But as we were gathering around him to hear the tale which he could tell so well, he has passed from our sight, leaving us to regret what he has taken with him in his well-stored memory, as well as to mourn his noble, generous, kindly self.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Pittsburgh & Lake Erie.—Extended from Beaver Falls, Pa., southeast to Middletown, 28 miles.

Kankakee & Southwestern.—Extended southwestward 13 miles to a point 30 miles south by west from the Illinois Central at Otto Junction.

Chicago, Milwaukee & St. Paul.—The *Hastings & Dakota Division* has been extended westward 64 miles to Granite Falls, Minn.

This is a total of 105 miles of new railroad, making 1,527 miles completed in the United States in 1878, against 1,629 miles reported for the corresponding period in 1877, 1,770 in 1876, 920 in 1875, 1,242 in 1874, 2,955 in 1873, and 5,312 in 1872.

THE DENVER & RIO GRANDE RAILWAY, whose lease to the Atchison, Topeka & Santa Fe is just announced, has 337 miles of road, and gives the Atchison road a connection, though an indirect one, with Denver. Its net earnings were 45.6 per cent. of its gross earnings in 1874, 42.7 in 1875, 41.6 in 1876, and 44.3 per cent. in 1877—averaging very nearly what the lessor promises to pay as rental the first year. It has been able to obtain very high rates on the largest part of its traffic—8 or 10 cents a mile for passengers, we believe—but for which the proportion of net earnings would have been much smaller. Whether the lease will be profitable or not will depend largely on the possibility of maintaining these high rates until there has been a considerable growth in the traffic; but there seems little reason to suppose that the rates cannot be maintained should no competitor appear, which is extremely improbable, as the traffic on the line is very light and not likely ever to be heavy, and the company has not earned the interest on its bonds for the past three years, though default was not made until 1877. The debt, however, is pretty large for so light and cheaply built a road—about $20,000 per mile. We do not mean that it is a badly built road; on the contrary, it is said to be one of the best built narrow-gauge roads in the country.

A large increase in gross earnings is shown this year so far (about 45 per cent.), following extensions of the road recently made and the development of new mining regions in Colorado. These probably will make the net earnings sufficient to cover the interest on the bonds. Otherwise the road might fall into the possession of the bondholders, and the lease then would be of no avail. None of the road now completed by the Denver & Rio Grande will serve the Atchison, Topeka & Santa Fe in its progress southward and southwestward. It was only the proposed extension of the Denver road which was in the path of the company which has leased it. The two companies, if hostile, could have injured each other considerably, however, as the Denver & Rio Grande could have made connections with the East at Denver and the two lines then could have competed for the wool and cattle traffic of an immense, though very thinly peopled, territory, as these products are easily moved a hundred miles or more to take advantage of rates.

The traffic on these roads where they connect is now so very light and the distances over which it is carried are so great that the difference in gauge and the transfers that thus become necessary will hardly be a very serious disadvantage, at least not for any other than the Denver business, for which there is competition.

THE CORN CROP, which is the most important single crop grown in the United States, will be one of the largest and best ever grown. Considerable districts where corn is a leading crop suffered from excessive rains in June, and at the end of that month it was reported to be extremely backward, and there were dismal prognostications of the result. But the fall has been dry and frosts have been late, so that the fields planted latest—some in Illinois near the end of June—have matured perfectly, the latest being the best, and the crop was never in better condition to harvest so early in the season. And when corn has once become fully ripe and hard and dry, there is little or no anxiety about the gathering of it. The work may be more or less disagreeable or costly, but with almost any imaginable weather, the whole crop can be gathered, with comparatively little damage—in that respect being very different from the small grains, which must be gathered within a few days, and suffer very greatly if the weather is wet in harvest time. The abundant corn crop, however, is not marketed to any extent for some months after the gathering of it is begun; but it has an immediate effect upon shipments, because in any event most of this grain is consumed on the farms, and the producer is able to market his old corn as soon as he is sure of a surplus from the new crop. And this assurance has been having an effect ever since the middle of last July, which is stimulated by the favorable maturing of the crop. The largest crops of the country have been about 1,300,000,000 bushels, which is four times as much as the largest crop of wheat previous to 1878; and this year's corn crop is probably equal to the largest. In value, this is equal to twice that of the cotton crop, and to about one-fourth more than that of the wheat crop. In *weight* it is equivalent to about 36,000,000 tons, against 1,125,000 tons of the cotton crop, and 10,500,000 of the wheat. For transportation, however, corn is not nearly so important as these figures would make it appear, but a small portion of the crop being marketed. But a good crop has a great effect on transportation, as a comparatively small percentage of surplus gives a very large bulk to be carried. The effect of an abundant crop at a time when wheat is abundant and cheap is reflected in the very low price of corn, and will be seen later in great supplies of well-fatted hogs and corn-fed cattle. When corn is so cheap, however, only very low rates can be had for carrying it, and it not likely to come forward very freely in winter, at least not for export, at rates which will much more than pay the cost of hauling by rail.

THE LAKE MARINE, as we have intimated heretofore, and as formally stated in a selection from the Detroit Dry Dock Company's report which we publish elsewhere, has not decreased but has actually increased in capacity of late years, in spite of the very low rates, which to a very large part of the old vessels were doubtless entirely unprofitable. It seemed certain that when these low rates had prevailed a few years the lake fleet would greatly diminish, as there are considerable losses yearly, and it was hardly conceivable that investments would be made in new vessels for a business proved to be unprofitable. But it seems that there are vessels and vessels. While the small sailing vessels which prevailed a few years ago, carrying a few hundred tons and making six or seven trips in a season, were not making expenses, it seems that steamers towing large consorts, taking together 80,000 or 100,000 bushels, and making thirteen trips a season, were doing so well at the low rates that not only was their number kept up but considerably increased. This is a matter of deep significance to the railroad companies. It means that a restoration of prosperity will not bring a restoration of the old lake rates—that the latter, indeed, have been affected as rail rates have been affected—that is, by improvements which have caused economies in the actual cost of transportation. This is more surprising in the vessels than in the railroads, for navigation is an art older than civilization, on which the ingenuity of generations of men has done its utmost, while railroading is a thing of yesterday, which has hardly had time to emerge from the experimental stage. But the new step in lake navigation makes the difference in cost between lake and rail almost as great as ever it was, while at the same time materially decreasing the old difference in time of transportation. Competing with the lakes is now a much more serious thing than it used to be.

WATER RATES have again taken a downward turn between the West and the seaboard, both lake and canal rates having declined. During the week ending Oct. 15, it should be remembered, there was a serious decline in lake rates, from 4 to 3 cents per bushel on corn from Chicago to Buffalo. Thursday this rate fell further to 2¾ cents, and has so continued since, the rate on wheat being a quarter to a half a cent higher. Canal rates had been quite firm for some time at last week's rates of 8¼, 7¼ and 5 cents per bushel for wheat, corn and oats, respectively, from Buffalo to New York, or not lower than those figures; but by Monday of this week they declined to 8, 7 and 4¾ cents. Rail rates from Buffalo to New York remain unchanged. Western roads, especially those through the winter wheat districts, as far south as the latitude of Peoria, are said to have a good many cars for which they find it difficult to get freights, and it is not easy to maintain rates. It is not often that the railroads have to meet declining water rates so few weeks before navigation closes.

Through rates from Chicago to New York are now quoted as follows: Lake and canal, 12½ cents per bushel for wheat, 10¾ to 11¼ for corn, 8 for oats; lake and rail, 14½ for wheat, 13½ for corn, and 9 cents for oats; all-rail rates, meanwhile, are 30 cents per 100 lbs., that is, 18 for wheat, 16.8 for corn, and 9.6 for oats.

Ocean rates have fluctuated a little on grain, going as high as 7¾d. per bushel for grain, and quoted Tuesday at 7d. by steam to Liverpool, but most freights are substantially unchanged.

THE COTTON CROP now seems sure to be much the largest ever known. In addition to its good condition at the close of the growing season, we have had almost perfect weather for gathering, which for cotton is very important. The season for gathering that crop is as long as that for corn, lasting from August to January (sometimes later), but, unlike corn, it does not all become fit to gather at once, and bad weather both before and after it is open injures it. The Agricultural Bureau has published detailed estimates of area and condition for the whole cotton-growing country, from which the *Commercial and Financial Chronicle* estimates the crop to be 5,245,250 bales, and, what will probably carry much weight with those engaged in the cotton trade, the *Chronicle* sees no reason for questioning it, or for believing that the crop will in any event fall below that total. The crop of last year was 4,811,000 bales, and the largest on record, that of 1859, was 4,824,000 bales, so that this estimate would make this year's crop nearly 9 per cent. greater than any before it. It has been coming forward very rapidly and promising to cause a comparatively active season of trade and transportation in the South; but a recent considerable decline in the price may have considerable effect on the back traffic.

THE APPROPRIATION FOR RAILROAD MAIL SERVICE is so small that Mr. Vail, the General Superintendent of this service, gives notice that unless further provision is made by Congress it will probably be necessary to discontinue some of the service or reduce the rate of compensation below even that authorized by law. Notice is given to the roads which have been receiving from a specific appropriation payment for additional services that this allowance cannot be made after December, because of the inadequacy of the appropriation. The Post-Office Department has been year after year making improvements in the service which required more and more work from the railroad companies, for which Congress has persistently neglected to provide payment. As the branch of the government which holds the purse-strings seems determined not to spend any more money, it would seem desirable that the coat be cut according to the cloth, and the service adjusted to the means at its command, even if it has to be made worse instead of better. The tendency has been all the time to improve the service at the expense of the railroads, and we may be sure that Congress and the country will stand this as long as the railroads will.

ERIE SHAREHOLDERS have their last day of grace on Thursday of next week (Oct. 31), when the time will expire during which they can get the benefit of the reconstruction scheme and become shareholders in the New York, Lake Erie & Western Company by paying their assessments—two dollars per share on the preferred and four dollars on the common stock. As the shares with the assessments paid now bring on the Stock Exchange about $15 for common and $30 for preferred, there will doubtless be no failures to pay. The assessments on the common stock will yield $3,120,000, those on the preferred stock $170,738. It was originally proposed to make the assessments one-half greater, and then give income bonds for the whole amount of assessments, or at least give the shareholders their option of paying four and two dollars per share with nothing in return, or of six and three dollars with income bonds. This would be equivalent to selling income bonds for cash at 33⅓ per cent. of their face.

The Farmers' Loan and Trust Company receives the assessments for American stockholders.

THE BRITISH "AMALGAMATED SOCIETY OF RAILWAY SERVANTS," to which railroad employés of all classes belong, recently held a convention at Liverpool, at which the number of members was reported to be nearly 13,000, and the income above expenses of management nearly $40,000. The energies of the society are now chiefly devoted to opposition to the trip system, which even for enginemen has been but recently introduced into England, and to urging such a modification of the law concerning compensation for injuries to employés as will make the companies responsible for the results of accidents caused by the negligence of the superior officers of the injured employés, who now, by the rule of "common employment," are unable to recover. This Society does not like to contemplate the possibility of a strike, and this disposition is given as the reason why a proposal at the Liverpool meeting that no strike should be supported from the Society's funds unless approved by two-thirds of all the members did not even find a seconder.

WESTERN UNION RAILROAD SECURITIES, it appears, form a large part of the assets of the Glasgow Bank, whose failure for millions has been the financial event of the season. How much is in bonds and how much in shares is not stated: the bonds are perfectly good. The "estimated value" telegraphed is $1,792,250. The total bonds outstanding is $3,500,000; of stock, $4,000,000, a trifle more than half of which latter is owned by the Chicago, Milwaukee & St. Paul company. There has never been a dividend, but there is a little margin over interest charges.

THE EAST-BOUND POOL, which to be perfected requires agreements for the division of the traffic of Chicago and Cincinnati, is to be discussed and finally settled if possible at a meeting of managers to be held in Cleveland at a day not now fixed, except that it is to be after the 29th. The result will be likely to determine whether the winter's business will be valuable, or the reverse.

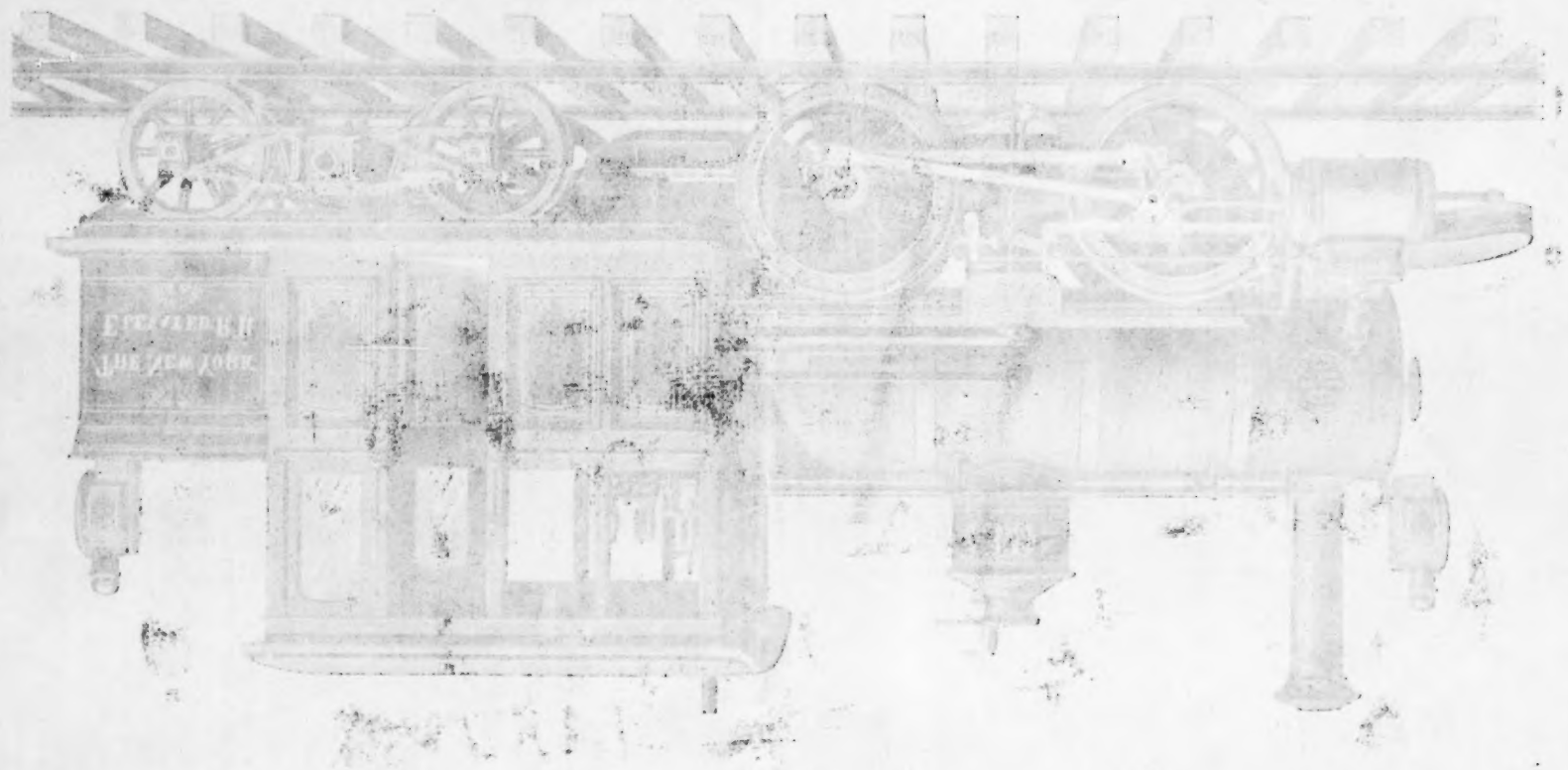
Contributions.

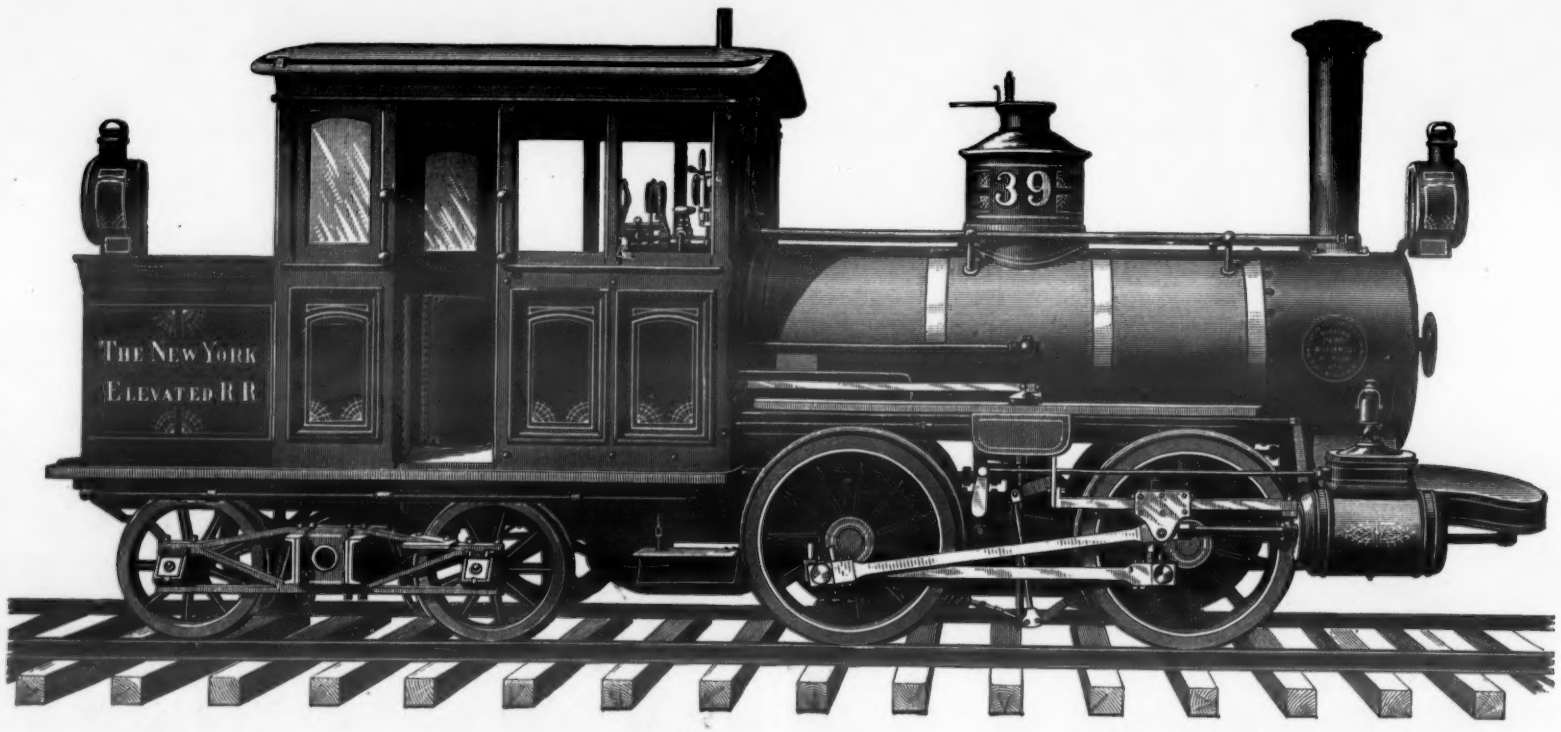
How to Preserve an Unused Locomotive.

LIGONIER, Pa., Oct. 9, 1878.

TO THE EDITOR OF THE RAILROAD GAZETTE:

It would be very interesting to many of your readers to have the views of some experienced engineers or machinists





"FORNEY" LOCOMOTIVE FOR THE NEW YORK ELEVATED RAILROAD.

By the Baldwin Locomotive Works, Philadelphia.

on the subject of the best method of preserving an unused locomotive. If, for instance, a road has two locomotives and but one in service, will it preserve both better to run them week about, or had one better be laid up in tallow or paint permanently till some emergency arises requiring its use? And if it is to be laid up, what is the best material and how used to prevent rust in the cylinders and valves, etc.?

If you can induce some of your correspondents to give their experience on these questions, it will much oblige

A. FRANK,
Engineer Ligonier Valley Railroad.

[We hope some of our readers who have experience in taking care of engines will give their experience in reply to the above.—EDITOR RAILROAD GAZETTE.]

The Proposed Uniform Freight Car.

Missouri, Kansas & Texas Railway,
Office Superintendent of Machinery.
SEDALIA, MO., Oct. 12, 1878.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The proposition made by Mr. John Kirby in the *Gazette* of the 4th inst., in favor of a "uniform freight car," and indicating a way out of the present diversified system, or want of system, may need no endorsement to insure it deserved attention. The subject, however, is one of such great and growing interest, it seems to call for an expression of views on the part of those interested. There can be no real objection to the adoption of standard *irons*, but every possible advantage in its favor; and as one whose daily duty makes the matter an ever-present concern, I can, and do, most heartily endorse the proposition.

It would seem to be the duty of managers of railways to to take action, if any is taken. Associations have heretofore failed to harmonize, and will probably always fail to agree upon a standard car. It matters little who compose the committee to decide upon the standard; if by reason of *long experience* and *practical knowledge* they are *fitted for the work*. Railway managers are seeking to reduce expenses, and in this direction they may effect an important item of expense, especially in the interchange of cars.

G. W. CUSHING.

"Forney" Locomotive for the New York Elevated Railroad.

When the construction of the elevated railroads in New York became an established fact, the question of the proper locomotive to be used for that purpose became an important one. In a late number of the *Railroad Gazette* an engraving of the engines employed on the Metropolitan Elevated road was published. They, as our readers will remember, have a pair of leading or "pony" wheels which have a radial lateral motion, at each end. The engines, it was found, however, had insufficient boiler capacity, and the last ones ordered, of which several are now running, have larger boilers than those first built.

On the old portion of the New York Elevated Railroad, four-wheeled engines, of which an engraving was published in the *Railroad Gazette* of May 9, 1874, had been used very successfully for a number of years. This naturally inclined those who had been first identified with its operation to adopt that plan of engine. As the requirements of the old line when extended, but more especially of the new East Side line, would probably demand heavier trains and higher rates of speed, the whole subject came up for full discussion before the order for the engines for the new East Side line was given out. Unfortunately the authorities differed in opinion. Some of them were in favor of heavier four-wheeled engines, while others recommended an eight-wheeled tank engine of the "Forney" plan. The advice of experts was sought, but those called in were about equally divided in opinion. Finally the board of directors decided the matter by giving an order for twenty engines, one-half of them to have four wheels and the other half eight wheels. A subsequent order was given and divided in the same way, but a more recent order has been given for twenty-five engines, all to have eight wheels, which may be interpreted as a decision of the question which was theretofore in doubt.

We give with this number of the *Railroad Gazette* a full-page engraving of the eight-wheeled engines which are now at work on the East Side or Third avenue line. The readers of the *Railroad Gazette* know, doubtless, that this is the plan of engine which has so long been advocated by Mr. M. N. Forney. While a number of such machines have been built and wherever used have worked satisfactorily, this is the first occasion where they have come into extensive use. Thus far they have worked very successfully, as any one may see for himself. The engines are run both ways, without turning around, and run over curves of 100 ft. radius. The service is very severe, as the stations are only about a quarter of a mile apart, and, therefore, to put the case in a Hibernian way, the running consists chiefly of stopping and starting.

The principal dimensions of the engines are as follows:
Cylinders, 10 × 14 in.
Driving-wheels, 38 in. diameter.
Distance between centres of driving-wheels, 5 ft. 6 in.
Total wheel-base, 15 ft.
Length of fire-box, 42 in.
Width of fire-box, 34 in.
Inside diameter of boiler at smoke-box, 34 in.; 105 tubes, 1½ in. diameter, 5 ft. 10 in. long.
Height of chimney above rail, 10 ft. 10½ in.
Capacity of tank, 475 gallons.
Size of steam-ports, ⅞ × 9 in.
Size of exhaust-ports, 1½ × 9 in.
Lap of valve-ports, ⅝ in.
Maximum travel of valve, 3¾ in.
Total weight of engine, with full supply of water and fuel, 29,890 lbs.
Weight on driving-wheels, 19,170 lbs.
Weight of engine without water or fuel, 23,380 lbs.

The engraving is made from a photograph of one of the engines built by the Baldwin Locomotive Works, of Philadelphia, but a portion of those now in use on the New York Elevated road were built by the Rhode Island Locomotive Works, of Providence, from the same drawings and specifications.

Through Traffic on the Grand Trunk.

In reply to a circular by Mr. Alexander McEwen, who proposed to abandon the through traffic on this road, as unprofitable, and rent out the superfluous rolling stock, the President, Sir Henry W. Tyler, has issued a statement from which we take the following, premising that the portion quoted from his speech of April 29 last has already been published in these columns. (May 17, 1878, page 246):

The question thus raised is an exceedingly important one, and it has long received the continuous and anxious attention of the board. It formed also the subject of a special and lengthened investigation by the board in the early part of the present year, with the assistance of Mr. Hickson, who was, after full conference with the other officers of the company, brought over from Canada, for the very purpose, to a large extent, of exhaustively discussing the company's position in regard to the through traffic. The rates obtained, and the relative value of them to the company, may be well appreciated by a perusal of the following extract from my speech from the chair at the half-yearly meeting of shareholders on the 29th of April last:

"Looking back to the experience of the last six years, we find that the average earnings per ton per mile in the December half-years from 1872 were as follows:

1872	1.38	cents, or say	0.70	penny.
1873	1.44	" "	0.72	"
1874	1.10	" "	0.55	"
1875	1.00	" "	0.50	"
1876	.75	" "	0.38	"
1877	.80	" "	0.40	"

and the number of tons moved one mile, were:

1872	221	millions of tons.
1873	238	" "
1874	332	" "
1875	342	" "
1876	377	" "
1877	435	" "

So that we have, you see been in the disagreeable position of continually and largely increasing the volume of our business at the same time that the rate of remuneration for its transport has proportionately decreased. I trouble you with, and ask your special attention to these figures, because it is desirable that we should all clearly understand our precise position, the difficulties that we have to encounter, the obstructions that lie in the way of our prosperity, and the remedies required to overcome them. It is not an increase of freight traffic that is wanted; we have as much as we could desire, and sometimes more than we can carry. It is not the means of conveyance that are wanting; we are able, as you observe, to carry enormous and continually increasing quantities. It is the one element of 'rates' that weighs us down, and prevents us from paying dividends, as we ought to do if those rates were reasonable, upon all our stocks. It is the want of reasonable rates, also, which affects the question of our working expenses. These expenses have been reduced, it is true to 75 per cent., as compared with 80 per cent. for the corresponding half-year; and they had been kept at the lowest point consistent with efficiency. But we cannot properly maintain our undertaking and conduct 435 million tonmiles of traffic below a fixed cost; and the relation of working expenses to gross receipts must, even with the cost of maintenance and working reduced to the lowest point, depend solely upon this element of rates. We received as an average, in 1873, nearly a cent and a half—say three-fourths of a penny per ton per mile, and the lowest average rate which we received for working our traffic prior to 1876 was a cent, or say one-half penny per ton per mile. That rate would, on the traffic of the December, 1877, half-year, have given us ¼ more on our freight receipts, or no less a sum than £179,000 of additional net profit, in addition to the £256,100 which we received, making a total net profit of £435,100 out of a total receipt of £1,204,260. If, therefore, we had only received an average rate of one half-penny per ton per mile, which was the average rate of 1875—and a low rate—for working our freight traffic, our proportion of working expenses would have been only 64 per cent. of the gross receipts. In like manner, if we had received the rate of 1873, which was 1.44 per cent., or nearly ¾ of a penny per ton per mile, then our net profit for the half-year would have been about £900,000, and our proportion of working expenses would have been about 47 per cent. But even the additional £179,000 of net profit, which the very moderate average rate of ½d. per ton per mile would have given us, would have sufficed to provide £30,000 for the balance of dividend on the first preference stock; £58,000, or 2½ per cent. for the half-year on the second preference stock; and £89,000 or 1¼ per cent. for the half year on the third preference stock. This, gentlemen, is the possibility before us, without *any* further increase to our traffic, or to our means of accommodating it, if we can only, by the avoidance of unreasonable competition, obtain the very moderate rate of ½d. per ton per mile for our freight traffic, the lowest rate, which as I have said, we experienced before the year 1876."

The determination of the precise figure at which profit ceases, and different descriptions of traffic are carried at the bare cost of conveyance, involves more difficulty than is generally imagined; but it has been practically arrived at with sufficient accuracy to admit of definite instructions, which, having been, as a rule, enforced, the gross receipts, especially for the past year, during which very low rates have ruled, have suffered accordingly. All possible measures have been adopted for improving and developing the local traffic, but they have lately been attended with little success, in consequence af the extreme depression of trade and commerce in the Dominion. For that reason the local passenger traffic has been constantly declining, and imports have been at a low ebb, while the lumber trade has collapsed, and if the through traffic had been neglected it would not have been possible to maintain the credit of the company. It is, of course, unwise to carry traffic at a loss, and the directors have long since instructed their officers not to do so. It would be no less unwise to refuse traffic yielding a profit. Any improvement in rates, on the cessation or lessening of competition, will practically be an increase of net profit.

* * * * * * * * *

The course which the directors and their officers have pursued during these trying times has been simple and consistent. They have used every exertion to derive from local and through traffic all the net profit that each, at the best rates that could be obtained, was capable of yielding. If they had given up the through traffic, they could not have derived from local traffic as much total net profit as they have received, and the property would have been in a condition of serious embarrassment. They have succeeded, contrary to the expectations and loud predictions of many, and the strong assertions of some who professed to be well acquainted with the concerns of the company, in guiding it safely through almost overwhelming difficulties and accumulated misfortunes. They have entirely cleared it of a heavy burden of debt, they have placed it in a better condition, as regards its permanent way and rolling stock, than at any period of its history, and they paid a dividend last year (1877) on the first preference stock. When Mr. Vanderbilt recently acquired additional systems of railways in Michigan, it became necessary to provide for any contingency which might arise. And the directors prepared accordingly to establish alternate connections with the sources of traffic in the West; or to negotiate for improved rates; and to act in other respects as might be necessary. The most advantageous course for the Grand Trunk Railway, as well as for the other great systems of the American Continent, was obviously a division of traffic, to be carried by each at the best rates which within reasonable limits could be obtained. *Agreements of this nature have now been effected in some instances and are being negotiated in others;* and if only they are adhered to, more profitable rates may again be obtained by all parties; and it will then, at all events, be impossible to raise the question as to whether the through traffic is remunerative. But no more inopportune time could be chosen for raising such a question as is discussed in Mr. McEwen's printed and widely diffused circular, than *this* moment, when, after years of struggle and negotiation, *such agreements are being finally negotiated;* and when, in the true interests of the shareholders, it is desirable to encourage allies and to take firm ground with opponents. If Mr. Vanderbilt employs wisely the increased power, to acquire which he has spent enormous sums of money, he may work vast benefit to his own property, and earn the gratitude of all the owners of railway property in America. If he attempts by means of it to coerce rival systems, he will necessarily be himself among the greatest sufferers. Giving him credit for adopting the wiser course, the prospect for American railroads is now better than it has been for several years past, and there is no company in a better position to take advantage of any improvement that may happily result than the Grand Trunk Company.

Increase in Capacity of Lake Tonnage.

In a recent report of the Secretary of the Detroit Dry-Dock Company appears the following, concerning the traffic and carrying trade of the lakes:

The increased capacity this year in grain tonnage, as compared with 1873, will doubtless surprise many ship-owners—especially those who have lately, or are now, having new vessels built. The prevailing opinion held by vessel men has been that the grain tonnage lost by shipwreck or classed down by the underwriters for the past five years, has been largely in excess of the new tonnage added during the same period, and, therefore, that the grain tonnage is now largely below what it was five years ago. The contrary is the fact, as the underwriters' classification fully proves.

Vessel men generally have lost sight of the fact that a large percentage of the new tonnage added during the past seven years has been steam vessels, and steam vessels and their consorts, with large carrying capacity, and making, on an average, more than double the number of trips per season that sail vessels make. The increase in grain tonnage this year over 1873 is about 17 per cent. The increase in lumber tonnage is nearly 100 per cent. The season's capacity of 1878 foots up, in round numbers, 162,000,000 bushels of wheat, as compared with 130,000,000 bushels of 1873; and in lumber tonnage the season's capacity for 1878 is 1,300,000,000 feet as compared with 780,000,000 feet for 1873. With these facts before us, it does not require a great amount of knowledge to solve the cause of the depression in the vessel interest. The law of supply and demand was disregarded, and over-production, especially in the years 1873 and 1874, was the straw that broke the camel's back.

It is noteworthy that the increased capacity in grain tonnage this year over 1873 is found to be in steam vessels and their consorts, while in lumber tonnage the increased capacity is about evenly divided between steam and sail. In grain-carriers this season the average tonnage of each, as compared with 1873, is noticeable. This year steam and sail vessels average 830 and 394 tons respectively; in 1873 the average for the same was 680 and 339 tons each. The large increase in steam and barge tonnage, and their thirteen trips per season, as compared with six or seven trips for sail vessels, points conclusively to what is fast becoming an acknowledged fact—that steamers and their consorts (or, as many believe, large steam vessels alone), with the railroads, will ultimately do the carrying trade of the lakes, a result that will compel the conversion of a portion of our large fleet of tugs to other uses than towing vessels through the Detroit and St. Clair rivers.

The enlargement of the Welland and St. Lawrence canals will, when completed, doubtless encourage the direct shipment of grain from our lake ports to foreign countries, and our sail vessels, being better adapted for ocean voyages than our present style of steam vessels, will largely control that trade, or, at least, until suitable steam vessels are built for it.

Thinking that a comparative statement of the lake and rail shipments for 1872 and 1877 might be interesting to vessel men, the attempt was made to obtain complete statistics for all the lake ports, but only the following were secured. Shipments of grain (including flour reduced to grain) by lake and rail from the ports of Chicago, Toledo, Milwaukee, Detroit and Duluth were, in years named, as follows:

	1872.	1877.
Lake	90,565,230	87,477,673
Rail	46,792,227	73,492,116
Total	137,357,457	160,965,789

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

The Central Association of General Ticket and Passenger Agents will hold its second meeting at the Grand Pacific Hotel, Chicago, beginning at 10 a. m., Wednesday, Nov. 13.

The *Narrow-Gauge Convention* will meet, pursuant to adjournment, in Cincinnati, Oct. 23.

The annual convention of the *Railroad Claim Agents' Association* will be held at the Planters' Hotel, St. Louis, Dec. 4, having been postponed to that date from Oct. 15.

Dividends.

Dividends have been declared as follows:

Boston & Maine, 3 per cent., semi-annual, payable Nov. 15, in Boston.

Railway Equipment Trust, of Pennsylvania, 2 per cent.,

quarterly, payable Nov. 1, at the office of the Pennsylvania Company for Insurance on Lives, Philadelphia.

Car Trust of Pennsylvania, 1½ per cent., quarterly, payable at same time and place

Evansville & Terre Haute, 2½ per cent., semi-annual.

Southern Time Convention.

The Southern Time Convention met at the Windsor Hotel, New York, Oct. 17. Nothing was done beyond the usual routine work, a committee being appointed to prepare the winter time schedules, and its report being accepted with no important amendments. The new schedule will take effect Nov. 10; it provides for a change in the night-train between New York and Washington, which is made to leave later than at present. It also provides for a fast Southwestern mail train, and for a fast through train from New York to Jacksonville, Fla., to be put on later in the season. It was resolved to hold the spring meeting at the Continental Hotel, Philadelphia, April 16, 1879.

Passenger Agents' Meeting to Revise Colony Rates.

On Wednesday of this week, Oct. 23, a convention of lines in Ohio and Indiana interested in the "colony rates" made on bodies of emigrants to Kansas, Nebraska, etc., was held at the Kennard House, Cleveland, at which representatives were present from the Baltimore & Ohio, the Pittsburgh, Cincinnati & St. Louis, the Atlantic & Great Western, the Lake Shore & Michigan Southern, the Cleveland, Columbus, Cincinnati & Indianapolis, the Chicago, Saginaw & Canada, the Wabash, the Lafayette, Muncie & Bloomington, the Indianapolis, Bloomington & Western, the Columbus & Toledo, the Marietta, Pittsburgh & Cleveland, the Ohio & Mississippi and the Vandalia Line.

The session opened at 11 o'clock, with L. M. Cole, of the Baltimore & Ohio, in the chair, and J. M. Hall, of the Wabash, as Secretary. The Chairman said that the convention had been especially called for the purpose of regulating the existing passenger colony rates, and called for an expression of opinion from those present. Remarks were made by the different representatives, from which it was learned that this business was at present being done at rates that were not remunerative to the companies, and in order to obviate this it was proposed to revise the rates from all common points to the Missouri River, for the purpose of forming a basis upon which to make colony rates into the states of Kansas and Nebraska. After a general discussion of the question, the rates were revised so that they were placed at an advance varying from 15 to 20 per cent. above the existing rates.

The Narrow-Gauge Convention.

The adjourned session of this convention met, as appointed, in Cincinnati Wednesday, Oct. 23, Col. E. Hurlburt, of Bedford, Ind., presiding, and delivering an opening address. At the afternoon session, the report of the Committee on Machinery and Rolling Stock was presented by Col. Hurlburt. The President of the Convention stated that on the 1st of last January there were nearly 3,100 miles of narrow-gauge railways in operation in the United States, the greater portion of which had been built within the last five years, and as many more were now projected. The committee's report claimed that a narrow-gauge engine, of the same capacity as a standard engine, could take up the same grade more tons of paying freight, because it had less dead weight of cars, and that in transportation of passengers the same rule would prevail. The following questions were submitted for discussion by the Executive Committee: How far narrow gauge savings in first cost, interest account, dead weight, wear and tear, repairs, etc., affect freight rates; comparison between standard and narrow gauges as means of development; the general availability of narrow-gauge lines to localities now deprived of any line of railway; to demonstrate to capital that narrow-gauge railways, economically constructed and operated, are safe investments. The National Central Executive Committee were constituted a Board of Statistics, to collect all information relative to narrow-gauge construction and operation.

Baggagemen's Mutual Benefit Association.

The third annual convention of the Railway Train and Station Baggagemen's Mutual Benefit Association of the United States and Canada, assembled at Columbus, O., Wednesday, Oct. 23. About 20 delegates attended, representing 150 members.

Brotherhood of Locomotive Engineers.

The fourteenth annual meeting of the Grand Division began in Masonic Hall, Indianapolis, Oct. 16. The officers, Grand Chief Engineer P. M. Arthur, Cleveland, O.; First Grand Engineer T. S. Ingraham, Cleveland; First Grand Assistant Engineer L. B. Greene, Cleveland; Second Grand Engineer Wm. Robinson, Toronto, Ont.; Third Grand Assistant Engineer Daniel Bennett, Chillicothe, O.; Grand Guide Phillip Potter, Peoria, Ill.; Grand Chaplain George W. Tyer, Indianapolis, were all present, with the single exception of L. B. Greene, First Grand Assistant Engineer, who was confined to his room by sickness although present in the city. About 100 delegates were present, with a number of spectators. The exercises were opened with a prayer by Rev. Dr. Henry Day. Mayor John Cavan was next introduced to the audience by Chaplain Tyer as the staunch friend of the workingman. In an elaborately prepared speech of some length, the mayor bade the visiting engineers welcome to the city of railroads. He paid a glowing tribute to the vast work that has been and is daily being accomplished by the iron belts, and the brave men who drive the iron horses.

The task of responding to the address of welcome was assigned to First Grand Engineer Ingram, of Cleveland. He briefly expressed the thanks of the brotherhood for the kind welcome the members had received at the hands of the city officials and their brethren. Mr. Tyer read a dispatch from Lieutenant Governor Gray, expressing his regrets at his unavoidable absence from the city and wishing the members a pleasant time and a fruitful session.

Grand Chief Engineer Arthur then proceeded to deliver his annual address, for the following report of which we are indebted to the Indianapolis *News*:

Mr. Arthur said, in substance, as follows: We have reason for thankfulness to God for his kindness toward our association during the past year, which has been a most remarkable one in our history, in many respects the most remarkable of any since our organization. When we look over the past year and realize what has taken place, we cannot but express our gratitude to God, that in the midst of all the storms and trials, we have suffered so little. In looking over the list of delegates, who composed the convention of 1864, I find that there are very few that are in active service as engineers to-day. Some are superintendents, some master mechanics, some road-masters and some have taken service in a higher employ than any on earth. I believe two, Chaplain Tyer and William Allen, are the only ones present to-day who were there on that occasion. We have equal reason to be thankful to God for the past year for other reasons. The year just passed has been fraught with occurrences of the most remarkable character. Men of seeming honor and integrity have sought to destroy this organization that they had sworn to uphold and defend. Engineers on the Delaware, Lackawanna & Western, the New Jersey Central and the Lehigh Valley railroads —members of this brotherhood—have forged papers purporting to have come from the officials of the roads, threatening the brothers with instant dismissal unless they abandoned the order. These papers they were told to sign. Some of these men were the most zealous strikers in 1876. This conspiracy to ruin the order only proves that the sub-divisions are not careful enough in their selections of their candidates. They have not examined carefully enough into the character of the men who are presented to them by admission. We must be more vigilant in the future. Had we been more rigid in enforcing the by-laws we would not have been so disgraced by the conduct of these unworthy members. The prejudices against the order in various parts of the country have been caused by the ill-advised conduct of some of the members. It is mortifying to think that we had such characters in our midst. While we admit that great errors have been committed by members of the order, we still claim that some railroad officers are in the wrong. There are some railroads that have refused to employ brotherhood engineers. This I claim is wrong and tyrannical. What has the Brotherhood of Locomotive Engineers ever done that they should try to destroy it? Nothing. If it has, then let it be dissolved at once. If on the other hand it is a benefit, then I claim that it is the duty of every engineer to uphold and sustain it at all hazards. Go back a few years, the locomotive engineers had done nothing to commend them to the public. Some were dissipated and reckless, and sadly incapable. Our association for twenty-five years with them makes us speak with certainty of them. The brotherhood has turned many from paths of ruin to paths of rectitude and right. We have paid out to the widows and fatherless children $1,010,144, and over $150,000 has been expended on the poor and needy. This couldn't have been done without an organized effort. It is a blessing to the members, the public and the railroads.

We have no striking policy, only such as the emergencies of the cases may demand. We always insist that strikes could have been avoided, had the railroad officials treated us fairly. We assert that in no case have we as an organization, dictated to a company who and how many engineers it should employ or what wages it should pay. We claim the right to approach our employers in a respectful manner and present our grievances by a committee of our own selection. This right has been denied us, and our committeemen have, in some instances, been discharged. We disclaim all responsibility in strikes; they were all forced upon us. We believe in arbitation, and recommend it as the future rule of action.

To the placing of ignorant men in positions over the engineers can all these troubles be attributed. When good men of solid common sense have been given places of trust, we have had less trouble. Men will combine to protect their interests. There is, however, a strong inclination on the part of the railroads to make war against such organizations.

There has been a large falling off in the membership of our insurance during the past year. Frank Abbott, the founder of the association, and for ten years its Secretary and Treasurer, has proved himself to be a thief and has stolen from the widows and orphans. His peculations and those of some of the division secretaries have caused many of our members to forfeit their membership, and a feeling of insecurity has seized upon that portion of the public interested in the organization.

Society owes no man anything which he has not earned. I have no faith in men who go about the country as champions of labor and as friends of the working man, who berate capitalists and all who do not accord with them in their peculiar views.

During the past year the circulation of the *Journal* has been 7,000, and has been very prosperous to the publishers. There have been three new sub-divisions chartered, in Los Angeles, Cal., Winona, Minn., and Lacrosse, Wis.

In concluding the speaker paid a high tribute to the Young Men's Christian Association and the work it was doing for the engineers. The Secretary of the Indianapolis branch, Mr. G. C. Cobb, was praised for his integrity and honesty of purpose.

Mr. Arthur was followed by Wm. Robinson, Second Grand Engineer, representing the brotherhood in Canada, in a short speech briefly giving an account of the Canadian brethren. This concluded the public exercises, and after passing votes of thanks for the addresses, the Brotherhood adjourned until afternoon. The further sessions were held with closed doors.

On the afternoon of Friday the delegates visited the Brightwood shops of the Cleveland, Columbus, Cincinnati & Indianapolis Railway, at the invitation of the officers of the road; on the afternoon of Saturday they visited the Indianapolis Water Works, and on Monday took an excursion over the Terre Haute & Indianapolis road to Terre Haute.

ELECTIONS AND APPOINTMENTS.

Chicago & Eastern Illinois.—At the annual meeting in Chicago, Oct. 15, the following were chosen directors: F. W. Huidekoper, Chicago; Franklin H. Story, Boston; Geo. W. Gill, Worcester, Mass.; Thomas W. Shannon, John W. Brookman and Henry B. Hammond, New York; C. E. Stevens, Boston; Joseph G. English, Danville, Ill.; T. F. Leonard, Springfield, Ill. F. W. Huidekoper was chosen President; A. S. Dunham, Secretary and General Ticket Agent; J. C. Calhoun, Treasurer; O. S. Lyford, General Superintendent; Robert Forsyth, General Freight Agent.

Cincinnati, Sandusky & Cleveland.—At the annual meeting in Sandusky, O., Oct. 16, the following directors (one-third of the board) were chosen: J. A. Jeffrey, Columbus, O.; John Atkinson, N. W. Pierce, Boston. The board re-elected John S. Farlow President; N. W. Pierce, Vice-President; John L. Moore, Secretary and Treasurer.

Danvers.—At the annual meeting in Boston, Oct. 17, the following were reëlected directors: Nathaniel G. White, Lawrence, Mass.; George C. Lord, Boston; Amos Paul, South Newmarket, N. H.; Nathaniel J. Bradlee, Boston; William S. Stevens, Dover, N. H.; James B. Nichols, Haverhill, Mass.; John F. Osgood, Boston. The same gentlemen were also chosen directors of the Newburyport Railroad, which, as well as the Danvers, is leased to the Boston & Maine.

Equitable Pipe Line.—John H. Dilkes, of Olean, N. Y., is General Manager and H. C. Beamer his assistant.

Evansville & Terre Haute.—At the annual meeting in Evansville, Ind., Oct. 21, the directors and officers were re-elected as follows: Samuel Orr, J. S. Hopkins, J. E. Martin, W. Heilman, D. J. Mackey, Samuel Bayard, C. R. Bement, H. M. Sweetser, Evansville, Ind.; J. W. Maddox, Vincennes, Ind.; J. H. Turner, W. R. McKeen, Josephus Collett, Terre Haute, Ind., and a successor whose name is not telegraphed, to the late W. K. Edwards; with J. E. Martin, President, and F. Heakes, of Evansville, Treasurer and Secretary.

Fitchburg.—Assistant and Acting Superintendent John Adams has been appointed Superintendent, in place of C. L. Heywood, resigned. Mr. E. S. Washburn has been appointed General Traffic Manager, a new office. Mr. Washburn has been for some time General Manager of the Hoosac Tunnel fast freight line.

Hannibal & St. Joseph.—The General Manager gives notice that Mr. C. W. Winslow (lately appointed Purchasing Agent), having taken charge of the auditing department of the company, the purchasing department has been placed in charge of the Chief Engineer, Mr. T. L. Dunn, to whom all communications concerning the purchase of supplies should be addressed.

Illinois Central.—Announcement is made of the appointment of the following station agents; David E. Richmond at Mason, W. H. Pearson at Sigel, B. Hutchinson at Cabery, H. M. Alizored at Irwin, Israel C. Woodard at Blairsbury, Charles W. King at Lemars, and W. M. Chapman at Cobden. Several of these stations are on the new Kankakee & Southwestern Branch.

Louisville & Nashville.—Mr. E. B. Stahlman, of Nashville, Tenn., is appointed General Freight Agent, vice Mr. M. H. Smith, resigned.

Newburyport.—At the annual meeting in Boston, Oct. 17, the following were reëlected directors of this and the Danvers Railroad, both of which are leased to the Boston & Maine: Nathaniel G. White, Lawrence, Mass.; George C. Lord, Boston; Amos Paul, South Newmarket, N. H.; Nathaniel J. Bradlee, Boston; William S. Stevens, Dover, N. H.; James B. Nichols, Haverhill, Mass.; John F. Osgood, Boston.

New York, Lake Erie & Western.—This company has had the great good fortune to secure as General Manager Mr. Robert Harris, many years and until recently attached to the Chicago, Burlington & Quincy Company. Mr. Harris, who is a native of Portsmouth, N. H., acquired his profession as an engineer under Mr. J. W. Brooks, of Boston, long President of the Michigan Central Railroad, and saw his first railroad service on the Boston & Lowell, we believe. But nearly all of Mr. Harris' active professional service has been in the West, where he built the Beloit & Madison Railroad (now part of the Chicago Northwestern), and afterward was Chief Engineer of the Racine & Mississippi, now the Western Union. For a few months before the war he was Superintendent of a Texas road, and after some two years' service in the United States Army he accepted an appointment (in 1863) as Assistant Superintendent of the Chicago, Burlington & Quincy Railroad, where the venerable Col. C. G. Hammond was then General Superintendent. On Col. Hammond's retirement in 1865, Mr. Harris was made General Superintendent, which position he held until he was chosen President, in February, 1876, which position he held until last spring. The Chicago, Burlington & Quincy has always been distinguished as one of the best-managed railroads in the country, and it is remarkable that it has approved itself alike to its proprietors, the community which it serves, its employés and to other railroad men.

Pittsburgh & Lake Erie.—The following officers have been appointed: General Manager, Mr. W. C. Quincy, late General Manager of the Baltimore & Ohio lines west of the Ohio; General Superintendent, William Stearns, who had held that office during the construction of the road; Auditor, A. D. Smith (formerly of the Baltimore & Ohio); General Freight Agent, Charles A. Shipley, late Assistant General Freight Agent of the Baltimore & Ohio at Pittsburgh.

Ohio Board of Public Works.—Mr. George Paul, of Akron, who was chosen member of this board at the recent Ohio election, was one of the earliest advocates of narrow-gauge railroads in this country. He is still quite a young man.

Spring Valley.—The incorporators of this new West Virginia company are George Rutherford, S. Woodard, George B. Douglass, J. J. Upton and S. Gidley, of Petroleum; D. C. Pew, of Oil Spring Run, and W. H. Bachlett, of Volcano.

St. Louis, Alton & Terre Haute.—At a meeting of the bondholders, Oct. 21, Mr. J. S. Barnes, of the firm of J. S. Kennedy & Co., was chosen trustee of the mortgage in place of Robert Bayard, deceased.

Western Maryland.—At the annual meeting in Baltimore, Oct. 16, the following directors were chosen by the stockholders: John K. Longwell, Carroll County, Md.; Joshua Biggs, Frederick County, Md.; George N. Harris, C. W. Humrichouse, John Welty, Washington County, Md.

Woodruff Sleeping Car Company.—The lines of Lucas cars recently purchased by this company will be known as the "Southern Division" of the company, with C. E. Lucas, the founder of the lines and introducer of the cars, as Superintendent, with office at the Markham House, Atlanta, Ga. The cars run over what are called the "Cumberland," "Magnolia" and "Aiken" routes.

PERSONAL.

—John Stone, at one time Master Mechanic of the Des Moines Valley road, hung himself in a shed on the levee at Keokuk, Ia., Oct. 9. He was at one time a man of standing and ability, but lost position and finally became almost a common vagrant through excessive drinking.

—Mr. M. H. Smith, long General Freight Agent on the Louisville and Nashville Railroad, has resigned his position, dating from Oct. 14.

—Mr. Louis J. Wagner, for a time Superintendent of the Alabama & Chattanooga Railroad, died at East Saginaw, Mich., Oct. 20.

—Mr. Walter S. Gurnee, for many years a leading director and member of the Executive Committee of the Chicago, Milwaukee & St. Paul Railway Company, has resigned his seat in that board, and on Wednesday sailed for Europe with his family, intending to be gone for some time.

—Mr. I. N. Coly, of Albany, Paymaster's clerk on the Eastern Division of the New York Central & Hudson River Railroad for some thirteen years past, has been presented with a fine gold watch and chain, valued at $225, by the trackmasters of the division.

—Mr. Augustus Schell, who was nominated for Mayor of New York by the Tammany Democratic Convention last week, is a director of the New York Central & Hudson River, the Lake Shore & Michigan Southern and the Michigan Central railroad companies, and is Vice-President of the Lake Shore and member of the Executive Committee of the Michigan Central.

—Mr. George P. Robinson, General Baggage Agent of the New Orleans, Mobile & Texas Railroad, and brother of the Superintendent of that road, Mr. D. B. Robinson, died of yellow fever Oct. 4. He was formerly employed by the Central Vermont at St. Albans.

—Mr. Joseph A. Jordan, Train Dispatcher of the Chicago & Alton Railroad at Bloomington, Ill., was married Oct. 16 to Miss Emma D. Betts, of Bloomington, a niece of Judge and Senator David Davis.

—Mr. J. C. Blauvelt, a conductor on the New Jersey &

New York Railroad, has been nominated for Sheriff by the Democrats of Bergen County, N. J.

—Mr. Horace Knight, Secretary of the Huntingdon & Broad Top Railroad Company, died on the 15th inst. He had been Purchasing Agent for his road for some time, but had but just been chosen Secretary.

—Mr. Joseph R. Hixson, whose appointment as General Agent of the Chicago, Milwaukee & St. Paul for New England we noticed last week, was formerly General Agent of the Red Line at Buffalo. His new office is at No. 228 Washington street, Boston.

—Mr. Joseph Dana Allen, who was a professor of engineering (in Norwich University, Vt.,) before the days of railroads, died at Burlington, Vt., Oct. 12, aged 79 years. In his early practice he was engaged largely in canal construction, serving as engineer on the following: Blackstone (Massachusetts), Cumberland & Oxford (Maine), Black River & Chemung (New York). But he also had a great deal of practice in railroad construction, as on the New York & Harlem, the Utica & Oswego, etc. In 1838 he was appointed engineer of the Western Division of the Erie Railroad, and later had charge of the enlargement of the Erie Canal west of Little Falls. He was subsequently connected with the Syracuse salt works and the Winooski cotton mills; was for a time Consulting Engineer of the Chicago & Northwestern Railway and Chief Engineer of the Albany & Northern Railroad. He also laid out the Northern Extension of the Rutland Railroad.

—A report comes from Cleveland that Gen. J. H. Devereux, President of the Cleveland, Columbus, Cincinnati & Indianapolis and Receiver of the Atlantic & Great Western, will be appointed General Manager of all the Vanderbilt roads west of Buffalo; that is, of the Canada Southern, Michigan Central and Lake Shore & Michigan Southern, which would be one of the most important railroad positions in the world, and one for which Mr. Devereux has great and peculiar qualifications, alike in character, ability, influence and experience. But so far we have no other foundation for the report than telegrams to the New York *Herald*.

TRAFFIC AND EARNINGS.

Railroad Earnings.

Earnings for various periods are reported as follows:

	1878.	1877.	Inc. or Dec.	P. c.
Nine months ending Sept. 30:				
Pitts., Cin. & St. L..	$2,306,330	.....	.....	....
Net earnings.....	828,953	.....	.....	....
Eight months ending Aug. 31:				
Chicago, Bur. & Quincy.....	$8,996,425	$7,631,597 I.	$1,346,828	17.9
Net earnings.	3,990,992	3,301,904 I.	689,088	20.9
Four months ending Aug. 31:				
Wabash.....	$1,653,737	.....	.....	....
Net earnings.....	404,973	.....	.....	....
Month of July:				
New York, Lake Erie & West.....	$1,157,691	$1,041,205 I.	$116,486	11.2
Net earnings.....	326,709	171,316 I.	155,393	90.7
Month of August:				
Great Western	$335,800	$308,000 I.	27,800	9.0
Net earnings	83,700	73,000 I.	10,700	14.7
Chicago, Bur. & Quincy.....	1,632,209	1,330,249 I.	301,960	21.9
Net earnings	952,377	755,857 I.	196,520	26.0
Month of September:				
Phil. & Reading.. ..	$779,480	$1,527,439 D.	$747,959	49.0
First week in October:				
Atchison, Topeka & Santa Fe.....	$96,500	$71,009 I.	$25,491	35.9
Ind., Bloom. & Western.....	31,797	32,817 D.	1,020	3.1
Int. & Gt. Northern.	44,507	37,530 I.	6,977	18.6
Kansas Pacific.....	107,377	94,488 I.	12,889	13.6
Mo., Kansas & Texas	73,928	71,790 I.	2,138	3.0
St. L., Alton & T. H., Belleville Line.....	11,570	16,114 D.	4,544	28.2
St. Louis, Kan. City & No.....	71,779	77,334 D.	5,555	7.2
Toledo, Peoria & Warsaw	28,103	30,005 D.	1,902	6.2
Second week in October:				
Atchison, Topeka & Santa Fe.....	$119,500	$95,767 I.	$23,733	24.8
Bur., Cedar Rap. & Northern	32,487	36,622 D.	4,135	11.3
Chicago & Alton	131,426	116,608 I.	14,818	12.7
Chic. & Eastern Ill..	18,626	17,886 I.	740	4.1
Chi., Mil. & St. Paul.....	191,000	278,932 D.	87,932	31.5
Denver & Rio Gr'de.	27,099	.....	.....	....
Kansas Pacific.....	113,545	94,074 I.	19,471	20.7
Mo., Kan. & Texas..	78,007	81,943 D.	3,936	4.8
St. Louis, Iron Mt. & So.....	143,900	147,368 D.	3,468	2.4
St. Louis, Kan. City & No.....	90,363	89,537 I.	826	0.9
Wabash.....	105,157	117,328 D.	12,171	10.4
Week ending Oct. 12:				
Grand Trunk.....	$207,004	$221,694 D.	$14,690	6.6
Week ending Oct. 17:				
Detroit & Milwaukee.	$24,365	$23,278 I.	1,087	4.7

Coal Movement.

Receipts of coal at Chicago for the nine months ending Sept. 30 were:

	1878.	1877.	Inc. or Dec.	P. c.
Anthracite.....	248,719	270,410 D.	21,691	8.0
Bituminous.....	267,367	234,486 I.	32,881	14.0
Total.....	516,086	504,896 I.	11,190	2.2

Grain Movement.

For the week ending Oct. 12, receipts of grain of all kinds at the eight leading Northwestern markets, have been, in bushels:

1878.	1877.	1876.	1875.	1874.	1873.
5,698,206	5,519,469	6,104,195	4,986,513	4,006,901	4,885,946

This year the receipts are smaller than for any other since July, except that ending Sept. 28. But there were but four weeks in all last year when the receipts were so large.

The shipments of the same markets for the same week have been:

1878.	1877.	1876.	1875.	1874.	1873.
5,089,892	5,386,512	4,366,720	3,999,015	3,590,822	5,443,210

Though the shipments of the week this year were exceeded in the corresponding weeks of 1877 and 1873, and have been exceeded in six weeks this year, still since the fall of 1873 there have been only three weeks from the opening of navigation to this date in the fall, previous to this year, when they have been equaled.

Of the above shipments the number of bushels and the percentages of the total shipped by rail have been:

1878.	1877.	1876.	1875.	1874.	1873.
1,245,545	1,030,797	1,835,901	1,145,256	422,641	938,908
24.5 p. c.	19.1 p. c.	42.1 p. c.	28.6 p. c.	11.6 p. c.	19.1 p. c.

The rail shipments of the week this year are about equal to the average since harvest.

Receipts of the seven Atlantic ports for the same week have been:

1878.	1877.	1876.	1875.	1874.	1873.
7,343,525	5,742,997	3,712,853	3,817,656	3,154,393	3,980,203

Not only are the receipts this year vastly larger than for the corresponding week in any previous year, but they are larger than for *any* week in any previous year, and have been exceeded but once in the history of the trade, which was the week ending Sept. 14 this year. The largest receipts of any week last year were 6,375,000 bushels.

Of the receipts this year, 59.6 per cent. were at New York, 12.9 at Philadelphia, 12.3 at Montreal, 11.2 at Baltimore, 3.5 at Boston, 0.4 at New Orleans and 0.1 per cent. at Portland.

The exports of grain from the seven Atlantic ports for the week ending Oct. 12 were 4,196,783 bushels this year, against 2,880,267 bushels in 1877. Of the exports this year, 49.3 per cent. was from New York, 21.4 from Baltimore, 12.2 from Montreal, 9.8 from Philadelphia and 7.3 from Boston.

Receipts and shipments at Chicago and Milwaukee for the week ending Oct. 21 were:

	Receipts.	Shipments.
Chicago.....	2,710,560	2,176,312
Milwaukee.....	552,700	508,300

Receipts and shipments at both places are smaller than for the preceding week.

Receipts and shipments at Buffalo for the same week were:

	Receipts.	Shipments.
By rail.....	307,820	647,092
By water.....	3,291,870	3,162,079
Total.....	3,599,690	3,809,171

Receipts and shipments are both larger than for the preceding week, but rail receipts and shipments are both smaller.

For the same week ending Oct. 21 receipts at four Atlantic ports were:

New York.....	3,399,999	Baltimore.	611,157
Philadelphia.....	846,780	Boston.....	354,725

All these receipts are smaller than at the same places for the preceding week. Of the receipts at New York, 795,761 bushels, or 23.4 per cent., were by rail.

Cotton.

Receipts at Atlantic ports for the week ending Oct. 18 and from Sept. 1 to that date (48 days) have been:

	1878.	1877.	1876.	1875.	1874.
Week.....	160,233	135,054	152,820	147,345	127,976
48 days.....	685,839	397,429	633,029	570,582	500,701

The exports for the week and since Sept. 1 have been:

	1878.	1877.	Increase.	P. c.
Week.....	78,966	39,147	39,819	101.7
48 days.....	198,661	106,610	92,051	86.3

Notwithstanding the yellow fever New Orleans has received more this crop-year than last, though it has not nearly taken the same rank among receivers. Last year it received 15.3 per cent. of the whole; this year but 8.3 per cent., for the first six weeks of the season.

Apple Shipments.

Among other abundant crops this season that of apples seems to be superabundant, and there ought to be unusually heavy shipments of them, for the cost will be little more than that for packages and transportation. Recently a consignment of 2,200 barrels, making 13 car-loads, was forwarded at once by the Pennsylvania Railroad route from Grand Rapids, Mich., to Liverpool, and there are considerable shipments by every steamer.

THE SCRAP HEAP.

Railroad Manufactures.

The United States Wind Engine and Pump Co., of Batavia, Ill., has recently shipped a large number of wind mills to Cuba.

The Challenge Wind Mill Co., of Batavia, Ill., has received orders from New Zealand for a wind mill.

In the Chicago, Burlington & Quincy shops at Aurora, Ill., six or eight new locomotives are in course of construction, and fifteen new cars per week are now turned out.

The Dickson Manufacturing Co., of Scranton, Pa., on the 7th inst shipped the last of six new locomotives which it has been constructing for the Chicago, Pekin & Southwestern Railroad. They all have H. S. Bryan's patent crown-sheet and smoke-stack.

The Ohio Falls Car Company, at Jeffersonville, Ind., is building 15 passenger cars for the Atchison, Topeka & Santa Fe road.

Major Paul, of the Pittsburgh Car Company, offers to establish extensive car works at Minneapolis, with capacity for 3,000 cars per year, and employing 500 men, if the people of that town will meet certain requirements.

Whitney & Sons, of Philadelphia, have lately received two pairs of 30-in. passenger car-wheels that have made mileages of 80,000 miles, and a pair of 28-in. tender-wheels that have run 135,825 miles. These wheels were made by the firm.

William Sellers & Co. have taken the bulk of a recent order from New South Wales for fine machine tools, amounting to $25,000.

Dialogue & Co., of the Delaware River Iron Works, at Kaighn's Point, are doing some bridge work for the New York Bridge Company.

A new Siemens gas-furnace has just been completed at the Edgar Thomson Steel Works, making eight now in use. An excavation is being made for the foundation of a new six-ton steam hammer.

J. A. Fay & Co., of Cincinnati, manufacturers of wood-working machinery, recently shipped a car-load of machinery for various parties in Australia and New Zealand, consisting of over twelve machines, for planing, molding, tenoning, mortising, hand, scroll saws, etc. It goes overland to California, and thence by Pacific steamer. This company has also just made a large shipment of tools to the Russian government for its arsenal, located at St. Petersburg, and within the last month it has received over twenty orders for foreign shipment.

The employés of the Boston & Albany shops, at East Albany, N. Y., commenced on the 7th inst. working on eight-hour time, but work six days in the week, where they have been working five.

A better demand and more firmness in prices for iron are reported, but no advance in prices, except for some special qualities. Manufacturers generally, at least in Pittsburgh and further west, are encouraged.

The works of the Gautier Steel Co. (Limited), at Johnston, Pa., are fast approaching completion.

John Stephenson & Co., of New York, are furnishing the outfit for a tramway between Calais and St. Pierre, in France, which is being constructed with English capital.

The Cheney-Bigelow Wire Works, of Springfield, Mass., are at work on a large contract for wire railing for one of the New York elevated railroads.

The Latrobe Car Works are building for the Pittsburgh, Newcastle & Lake Erie Railroad 20 eight-wheel ballast cars, 20 box cars, 20 drop-bottom coal cars and two baggage cars.

J. L. Bailey & Co., Philadelphia, have contracted to deliver 3,600 hammered axles for the freight cars that are now being built at Berwick, Pa., for the New York, Lake Erie & Western Railroad.

A call for a general meeting of manufacturers of boiler plate has been issued at the suggestion of the United States Supervising Inspector General of Steamboats, to give expression to their views regarding the execution of the requirements of the law concerning homogeneousness, toughness, etc. The meeting is to be held in Philadelphia, Nov. 13.

The Altoona Iron Co. is preparing to make considerable additions to its works at Allegheny Furnace, Pa., including an eight-inch train and two boilers. The puddling furnace is now run double-turn, and every department run to its utmost capacity.

The Albany *Argus* says the Horicon Iron Company's new billet iron works, at Ticonderoga, N. Y., have been in successful operation for about four weeks, and are turning out a daily product of six and a half tons. The new works consist of four improved Catalan forges, in which the tamped ore is deoxydized by roasting in a charcoal fire. The "loupe" thus formed is then reheated in a refining furnace and afterward drawn into 100-pound billets under a 16,000-pound stroke-hammer. The iron thus produced is claimed to be forged by the Swedish process, and equal to the best imported. The ore is obtained from the mines of the company, near Lake George, and the charcoal is burned from the white birch on its land.

The *Iron Age* makes the following report of the condition of the blast furnaces of the United States, Oct. 1:

	In blast.		Out of blast.	
	1878.	1877.	1878.	1877.
Charcoal.....	83	89	186	176
Anthracite.....	88	86	135	140
Bituminous.....	80	77	133	136
Total.....	251	252	454	452

The Dickson Manufacturing Co., at Scranton and Wilkesbarre, Pa., is building three large blowing engines for the Lackawanna Iron & Steel Co.

The Edgar Thomson Steel Co. is preparing to build three new blast furnaces at its works at Braddock's Field, Pa.

The Sunbury Car Wheel Co. is an organization which is building a large car-wheel foundry at Elizabethport, N. J., on land leased from the Central Railroad of New Jersey.

The Winslow Car Heater Co., at Cleveland, O., recently sold 100 of its car stoves to the Atlantic & Great Western.

The Deane Steam Pump Co., of New York, recently shipped 12 steam pumps to Amsterdam, Holland.

The Rogers Locomotive Works, of Paterson, N. J., now have a considerable number of locomotives under way, among them some for Brazil, New Zealand, Central America and Cuba, and of *eight* different gauges—2 ft. 6 in., 3 ft. 1⅝ in., 3 ft., 3 ft. 3⅜ in. (1 meter), 3 ft. 6 in., 4 ft. 8½ in., 5 ft. 3 in., and 5 ft. 6 in.

Bridge Notes.

Work has been resumed on the abutments of the Calvert street bridge over Jones' Falls and the tracks of the Northern Central Railway in the city of Baltimore. The entire length of the bridge between abutment will be about 600 feet, 140 feet of which will span the falls and 105 the railroad tracks. The balance of the length will be built upon trestles, supported by heavy iron columns, resting upon stone pedestals. For the accommodation of the railroad, the columns will be built far enough apart to admit of tracks between them, if required. The entire cost of the bridge is estimated at $135,000. As soon as work on Calvert street bridge is fairly under way steps will be taken looking to the building of bridges across the falls at North and St. Paul streets.

The two proposed new bridges at Niagara, to connect the Clark Hill islands with the main Canadian shore, will be 250 ft. in length each, and will be supported by wire cables resting on iron towers. The style of the work will be very similar to that followed in the erection of the upper suspension bridge. This scheme of connecting these islands with the main shore by means of two new bridges, in addition to the present suspension foot bridge, is the project of Mr. Sutherland Macklem, the owner of the property.

The New York Bridge Co., of No. 110 Broadway, has just taken a contract for a 140-ft. draw-span over Dutch Kills Creek, Long Island City.

Wilkins, Post & Co., engineers and bridge-builders, of Atlanta, Ga., have the contract for building the iron tower for the water works of the Deaf, Dumb and Blind Institute at Talladega, Ala.

Messrs. Post & McCord, of No. 102 Broadway, New York, have received the contract for the concrete foundations and iron tower for the Rear Beacon Light for Port Royal Harbor, S. C.

Clarke, Reeves & Co., of Phœnixville, Pa., have just finished an iron bridge over the Tombigbee River, near Columbus, Miss., for the Mobile & Ohio road. It has a draw-span 210 ft. long, and two fixed spans, one of 180 ft. and one of 70 ft.

Bids are invited for a new iron bridge to be erected over Quinnipiac River at Middletown avenue, between New Haven and East Haven, Conn., to be handed in by Nov. 7. The bridge is to be a single span of 150 feet between centres of supports, with roadway 18 ft. in the clear, not less than 11 panels. An abstract of the specifications has been printed and may be had on application to Charles E. Fowler, City Surveyor, Room No. 9, City Hall, New Haven, where full specifications and engineer's plans may be seen.

Notes.

The Mendota *Bulletin-News* says they have very accommodating conductors on the Chicago, Burlington & Quincy road. A lady was yesterday purchasing a ticket, having left her baby on the seat, when the train started. The conductor, discovering the situation, stopped the train in the lower edge of the city, backed up and united the mother and child. [Tableau.]

Timorous passenger (to porter who is "sounding" the wheels): "That wheel sounds cracked to me, porter." Porter: "It is, sorr; but faix Oi think she'll get as far as Dublin."—*Punch.*

The malice of the small boy interfered with in his pursuit of pleasure at other people's expense has rarely taken a more diabolic form than in the case of a ten-year-old apprentice to the gallows who on the New York, Lake Erie & Western, near Bradford, recently put a piece of iron across the track, and threw three cars of a train off, because a conductor had put him off a train on which he had been in the habit of stealing rides, and had told him to pay his fare in future.

English Praise of American Rolling Stock.

Not long ago Mr. Douglas Galton, who served on the jury on railroad appliances at the Philadelphia Exhibition, read a paper before the Institution of Civil Engineers on the subject of these appliances, in which he spoke very favorably of some peculiarities of American practice. In the course of the discussion which followed some very interesting statements were made by Mr. Isaac Lowthian Bell—perhaps the first of English authorities on the metallurgy of iron and steel. He said that "there were many things connected

with railway carriages in America which commended themselves to his own mind. In the first place they afforded great accommodation and convenience to passengers on long journeys. He spoke with some hesitation on the subject, but he could not help thinking that a structure unbroken, as it was, by door opening must possess greater strength than those constructed on the English principle;" and he added that, "having traveled many thousands of miles upon American railroads, either from the shape of the carriages, or from the character of the springs, or some other circumstance, he had never traveled more easily." In reference to chilled wheels he remarked that, "although his firm were pig-iron makers on a large scale, and had steel and iron in every shape at their doors, members might be surprised to hear that for their slag wagons, which were exposed to a good deal of hard work from the usual roughness of the appliances about a large ironworks, and the melted slag they were occasionally immersed in, they had some difficulty in getting any material to stand. They had tried cast iron, wrought iron, and then cast steel, but the substance which they had found to exceed any other in durability was that of *the chilled wheels brought from the United States.*"

Cambria Iron Works.

Great improvements are under way at these works. A new blowing mill, rolling a 5-in. bloom from an 18-in. ingot, is to be at work in a few weeks. It is a two-high mill driven by a double horizontal reversing engine. Siemens-Martin steel works are under way, a wire-rod mill in operation, a number of bolt and nut machines at work on product of the merchant iron mill, and a new horse-shoe machine nearly ready.

The company is also building 100 new coke ovens at Bennington, Pa., which are nearly all completed. It has 6,000 men at work.

Logging Railroads in Georgia.

A correspondent of the *Northwestern Lumberman* writes from Emanuel County, Georgia, as follows:

"Much has been said and written in regard to the availability of tram-roads, and their utility as a cheaper and better means of conveying timber to the mills. This mode of conveyance, so highly spoken of, and becoming every day more popular in the North and Northwest, is by no means a novelty with the southern millmen. Eleven years ago the practical mind of Moses Wadley, of the firm of Wadley & Co., in this county conceived and successfully demonstrated their superiority over any other means of hauling logs, and he laid down for the use of his own firm, the first road ever constructed for the purpose; subsequently Mr. George Garbutt, of this region, adopted his plan upon a road six miles in length, laid with stringers 5×9 inches and track five feet, the first engine being furnished by Mr. George E. Fifield, of South New Market, N. H., and the wheels and axles for the lumber trucks, with nine inches tread, by Messrs. A. Whitney & Sons, Philadelphia, Pa. Since the period of their introduction by Mr. Wadley many engines and over 200 miles of tram-roads upon his principle have been put in use throughout the South Atlantic States; hitherto the ordinary transit by mule teams was slow, costly and at times uncertain, the pine forests of the South differing widely in their yield from those of the North and Northwest. That of the former averages 2,500 feet of merchantable lumber per acre, not inclusive of sap boards and the smaller growth, unfit for mill purposes, while the product of the latter is immensely greater. With this great distinction in the yield per acre and the consequent distance to be hauled over by the southern millmen to keep up their supply of logs, was the tram-road constructed, and with the present low prices of lumber has proved to be their only salvation, as but little timber upon our water courses is now available except by their use. Many mills are now using a light T rail of iron with the same engine, while others, as Wadley & Co., use an ordinary railroad locomotive upon a heavy T-rail iron track of 13 miles in length, crossing one of the largest streams of the state with trestle and bridging of a mile in length. Some mills use only the stringer track, the trucks upon which are moved by mule power. These tracks are laid with a lighter stringer of 4×8 in. with a cross-tie pinned at each end. In Florida, and with mills bordering upon the Gulf, round poles or very small logs are laid as a track for hauling lumber and logs, the wheels used being concave, and not the ordinary flange wheels.

Belgian Contracts.

At a recent letting in Belgium the government gave out contracts for 54 locomotives. The John Cockerill works took eight ten-wheeled tank engines at about $12,300 each, the Belgian Company five of the same at the same price, and six freight engines with 5-ft. wheels at $8,200. Ten others of the latter type were also given to the Marcinelle & Couillet Company at the same price; the Coal and Metallurgical Company took four of the big ones and four of the small ones at these prices. The St. Leonard Company was awarded five yard engines, with 4-ft. wheels, at $6,860; the Haine St. Pierre Foundry and Manufacturing Co. took five of the largest type, and Messrs. L. & C. Carels were awarded seven of the 5-ft. wheel freight engines at $8,200.

Contributions for the Yellow-Fever Sufferers.

The employés of the Pittsburgh Division, Baltimore & Ohio Railroad, recently raised $935, which was sent to New Orleans for distribution.

Handling Grain in Buffalo.

A correspondent of the Cleveland *Herald* writing from Buffalo says:

"Nearly all the elevators are full of grain, and immense amounts are going forward constantly by canal and rail. The freight line propellers appear to have the preference over outside vessels in unloading. The appliances for getting wheat out of a ship are far in advance of those of a few years ago. Nearly all the work, including shoveling the grain in the hold to the cups of the elevator, is done by steam power supplied from the shore engine, and during the night the hold is illuminated by gas conducted from the building in rubber tubes. A steamer carrying 60,000 bushels is unloaded in a single night, and two canal boats are frequently brought along outside the propeller and filled at the same time the grain is coming out of the ship."

OLD AND NEW ROADS.

Atlantic, Mississippi & Ohio.—The case on a motion of foreclosure of a mortgage on this road, by English bondholders, came up in the United States Circuit Court at Richmond, Oct. 22, Judges Bond and Hughes presiding. The decree applied for by the Trustees of the Atlantic, Mississippi & Ohio consolidated bondholders asks for the sale of the whole line and its property as an entirety, subject to liens of the several divisional bondholders, and after payment of Receivers' and other outstanding indebtedness, the remainder of the proceeds to be divided among the holders of Atlantic, Mississippi & Ohio consolidated bonds. The Dutch bondholders, representing $2,000,000, through counsel, oppose the sale of the road, asking to become parties to the suit as defendants. This latter question occupied the attention of the court all day, being argued at length, and the case was continued until the next day. The total amount of consolidated bonds of the road secured by the mortgage under which the proceedings are now instituted is $5,470,000, with interest to Oct. 1, 1878, of $1,695,289.

The case was further argued Wednesday, and submitted to the Court, which reserved its decision. Subsequently the Court considered the petition of H. R. Stewart, as holder of certain certificates of the Virginia & Tennessee Railroad, the object of the holder of said certificates being to have them recognized as a lien superior to that of the Atlantic, Mississippi & Ohio mortgage. Other holders of the same certificates, which amount to $8,750,000, were represented by counsel. This cause, which is known by the title, Francis Skiddy *et al.*, Trustees, against the Atlantic, Mississippi & Ohio Railroad, was also argued and submitted to the Court.

Baltimore Elevators.—The Baltimore Elevating Company is building a third elevator at the Canton side of the harbor, where the Northern Central delivers grain. It will have capacity for 750,000 bushels, the other two containing but 500,000 bushels together. The contract calls for its completion by Dec. 18. G. W. Multon & Co., of Chicago, are the contractors. The Pennsylvania Railroad's deliveries of grain in Baltimore are said to have been unusually large this year.

Central of Guatemala.—A telegram from Panama, dated Oct. 12, says: "Work is progressing favorably on the Central Railroad of Guatemala. Several miles have already been cleared and prepared for grading, and a mile or two is now ready for the rails. The prevalence of rain just at present prevents a greater demonstration of activity, but with the beginning of the dry season gangs of men will be put upon each section, and the work rushed through in a few months. The bark Zephyros, with material of various classes for the work, is expected at San Jose during the latter part of this month."

Chesapeake & Ohio.—Oil tanks, iron buildings, and other apparatus for transferring oil from Ohio River boats to this railroad are now almost completed at Huntington, W. Va. A considerable amount of oil was shipped this way for export from Richmond and Norfolk in 1877, but the business has been but trifling this year.

Chicago, Burlington & Quincy.—Employment agencies in Chicago are advertising for laborers to work all winter on this road in Iowa (on new branches under construction, probably). Tie makers, section hands and gravel-train men are among those advertised for.

No less than seventeen firemen on this road have been promoted to be engineers within the past two months, which indicates growing traffic.

The following is the full statement of earnings and expenses for the month of August and for the eight months ending with August for the past two years:

August:	1878.	1877.	Inc. or Dec.	
Passenger	$210,783.36	$196,534.37	I.	$14,248.99
Freight	1,380,069.40	1,082,675.84	I.	297,393.56
Mail and mis.	41,334.50	51,038.59	D.	9,684.09
Gross earnings	1,632,209.26	1,330,248.80	I.	301,958.46
Expenses	679,829.83	574,391.60	I	105,438.23
Net earnings	952,377.43	755,857.20	I.	196,520.23
Eight months:	1878.	1877.		
Passenger	$1,571,171.17	$1,561,549.72	I.	$9,621.42
Freight	7,106,704.11	5,740,754.46	I.	1,366,009.65
Mail and mis.	318,489.53	329,292.42	D.	10,802.89
Gross earnings	8,990,424.81	7,631,596.60	I.	1,364,828.21
Expenses	5,005,432.49	4,329,692.30	I.	675,740.19
Net earnings	3,990,992.32	3,301,904.30	I.	689,088.02

The increase in net earnings for the eight months is equivalent to 2½ per cent. on the capital stock.

Chicago, Clinton & Western.—The Iowa Supreme Court recently decided against an application of the Bank of Montreal for a rehearing of a case in which the bank endeavored to establish the legality of $25,000 of certificates issued by the Receiver, Judge Thayer, for iron which was never delivered, and for which no equivalent had ever been received by the company. The Clinton *Herald* says the bank was an innocent purchaser, but loses the amount of the investment.

Chicago, Milwaukee & St. Paul.—The track on the Hastings & Dakota Division is now laid to Granite Falls, Minn., 75 miles westward from the old terminus at Glencoe, and 64 miles from Lake Addie, the last point noted.

Chicago & Northwestern.—The line of the Fox River Branch has been changed between Dundee and Algonquin, Ill., a detour of three miles being made to the bank of the river to take in the village of Carpenterville, where there are some factories which provided the right of way. The cost of the change to the company is said to have been but $15,000, and it secures an easier grade by it.

Cunard Steamers.—This company, whose New York terminus, so to speak, has always been in Jersey City, where it has had two large piers, and room for four steamers, will apandon them after the expiration of its lease next May, having leased Pier 40, North River, in New York, at the foot of Clarkson street, and made a contract for the construction of a dock there 75 ft. wide by 579½ long, with 30 ft. of water at the pier. It will have more convenient connection with the New York Central in New York, but will loose somewhat in convenience to the roads which terminate in Jersey City.

Denver & Rio Grande.—The conflict between this company and the Atchison, Topeka & Santa Fe has been suddenly ended by a contract for the lease of the Denver & Rio Grande's road to the Atchison Company. The lease is to take effect Dec. 1, and to continue for 30 years at a rental equal to 43 per cent. of the gross receipts for the first year, with a reduction of 1 per cent. each year following until the seventh. Then from the seventh to the fourteenth year, inclusive, the rental is to be stationary at 37 per cent. of the gross earnings, and for the remainder of the term, 16 years, 36 per cent. is to be paid. In determining the earnings of business passing over the lines of both the lessor and the lessee company, a mile of the Denver & Rio Grande is to be counted as a mile and a quarter, with certain exceptions.

The Atchison, Topeka & Santa Fe Company agrees not to build, operate or encourage any road, directly or indirectly, not already constructed, that is parallel to or competing with the Denver & Rio Grande's present constructed lines. The lease also provides that the Atchison Company shall not change the gauge of its road or lay a third rail without widening the gauge, or laying an additional rail, over all the Denver & Rio Grande lines, except those between Pueblo and the coal mines east of Cañon City. Any lines that may be built from any terminus of the Denver & Rio Grande road, or in extension thereof, shall be of three-feet gauge. The Atchison Company also binds itself not to discriminate in freight or other charges, in any manner, to the injury of the Denver and Rio Grande Company, and where traffic can be carried at the election of the lessee, it shall be transported by the shortest line.

The rental is to be paid by the month. When the Atchison, Topeka & Santa Fe takes possession of the leased road, it is to pay the Denver & Rio Grande for the fuel, material and other supplies on hand, a sum to be agreed upon by two persons, one to be appointed by the President of each road. This sum is to be applied by the Denver company to the payment of any of its debts, exclusive of stock, in excess of $22,664 per mile. The Denver & Rio Grande engages to deposit the money received for rent with the United States, or other Trust Company, in trust for the payment of interest on its debts, exclusive of stock, going to make up the sum of $22,664 per mile. If any surplus remains it is to be applied to the payment of such debts and liabilities in excess of the sum of $22,664 per mile, until fully satisfied, after which the money may be used in the redemption and cancelation of the Denver & Rio Grande first-mortgage bonds. No provision of the lease is to be abrogated or modified unless with the written formal consent of the trustees of the present mortgages of the Denver & Rio Grande Railroad, or of holders duly evidenced as such, owning or representing at least $2,000,000 bonds.

All the litigation between the two companies is to be abandoned, and the Denver & Rio Grande road is to be extended to the San Juan silver mines and through the Grand Cañon of the Arkansas valley.

Detroit & Milwaukee.—The Detroit *Free Press* of Oct. 20 says:

"C. C. Trowbridge, Receiver of the Detroit & Milwaukee Railway, vacated his position Saturday morning in pursuance of the recent order of Judge Reilly turning over the road, and the Purchasing Committee, of which J. H. Muir is Secretary, has temporarily taken charge of the road. The election of officers under the reorganization of the company, in conformity with the general railroad law, will take place Monday. F. Broughton, of the Great Western Railway, will probably be made General Manager, and he in turn will select his staff. It is pretty well understood that Mr. Callaway will be continued as General Superintendent and Mr. Broughton will undoubtedly retain for the present all the other officials. Alfred White, General Passenger and Freight Agent, was summoned by a telegram to a meeting in Hamilton by the Great Western management, which company will fully control the road, selecting the President, directors and all. General Manager Broughton left Hamilton Saturday for his summer residence at Eastwood."

The earnings from Jan. 1 to the date of this transfer were $127,758 greater this year than last.

Equitable Pipe Line.—This company, whose headquarters are at Bradford, Pa., purposes to lay a line of 6 in. pipe about 104 miles long from Frisbee by Coudersport, down Pine Creek Valley, by Salladesburg to Williamsport, Pa., there connecting with the Philadelphia & Reading Railroad. It is reported that surveys are all completed and right of way secured, and that work will be begun at once. Three pumping stations will be required and at Williamsport four to six tanks with a capacity of 25,000 barrels each. The entire cost is given as about $600,000. The pipe will be able to deliver, it is thought, from 8,000 to 12,000 barrels daily at Williamsport. There is talk of completing the line before the ground is frozen, which will require great activity in manufacturing pipe as well as laying it. John H. Dilks, of Olean, N. Y., is General Manager, and H. C. Beamer his assistant.

Fort Wayne, Markle & Southwestern.—Fort Wayne, Ind., has voted by a heavy majority against a proposed subscription of $65,000 to this projected narrow-gauge line. It was to run from Fort Wayne to Terre Haute, but is now probably killed.

Government Transportation on Land-Grant Railroads.—In the report of Quartermaster-General Meigs for the fiscal year ending with June last, he says that the movements of the army during the year were unusually extensive, due to the railroad riots and Indian disturbances. Marches of 800 to 1,000 miles were common, and several of 1,800 miles, two of 3,000, and one of 4,300 miles, were made. The largest movements were made by the Pacific railroads, and the appropriation for transportation was not large enough to liquidate their accounts. Gen. Meigs therefore recommends that Congress should make a deficiency appropriation of $825,000 to settle the accounts for the past year's service. He says the operations of the department are embarrassed by the action of Congress relative to land-grant railroads, to none of which can money be paid till the conclusion of a suit before the courts. As the principles and claims involved have been finally acted on by the Supreme Court, and judgment in favor of the roads on the rates heretofore fixed by the War Department has been given in every case finally decided, it is thought that it would be wise and just to repeal this restrictive legislation, and allow the railroad accounts to be settled like other accounts for military service, without imposing on the companies the delay and expense of formal suits hereafter in court, which involve only the two principles already decided in their favor. The several Pacific railroads have earned by military transportation during the fiscal year $895,000. Their total earnings for this service have amounted to over $9,000,000. Seventy contracts were made during the year for transportation by teams, and 36,559 tons of supplies were transported in this manner; 33,608 passengers and 36,000 tons of stores were moved by water. The cost of transportation on the Upper Missouri to supply the posts in the Sioux country continues great. Competition increases, and the rate is diminished from year to year, but the supplies needed continually increase, though a cessation of the increase is expected before many years, with the establishment of communities able to protect themselves against the savages.

Hartford, Providence & Fishkill.—Last week we noted that the city of Hartford sold on the 15th its holding of $500,000 of this company's bonds to the New York & New England Company, leaving outstanding only $500,000 owned by the city of Providence and $163,000 of Connecticut bonds. On the 18th the New York & New England paid Providence the money to redeem its bonds, and took a receipt. It also has paid into court $225,000 to cover bonds outstanding held by unknown parties, and gave a bond of indemnity for $125,000 to the trustees, and provided for the payment of the floating debt and for future claims. And on that day (Oct. 18) Judge Shipman, of the United States Circuit Court, made a final decree granting the New York & New England immediate possession, and the trustees transferred the road accordingly.

Illinois Railroad Assessment.—The proceedings of the State Board of Equalization of Assessments of Taxes gives the following totals for the railroads of the State:

Miles of main track in the State	6,574
Assessed value of same, excluding buildings	$25,473,009
Value of buildings on right of way	1,366,719
Miles of side or turn-out track	986
Assessed value of same	1,841,000
Assessed value of rolling-stock	6,971,171
Total assessment by State Board	36,410,576
Equalized value of railroad property assessed by local assessors	4,051,349
Total equalized value of all railroad property	40,461,865

Poor's Manual in its last issue gives 7,392 as the number

of miles of road in the State at the close of 1877, not including second track and sidings.

Illinois & St. Louis Bridge.—On the 17th, at St. Louis, in accordance with an agreement some time ago made by bondholders of different classes, a bill of foreclosure was filed against this company. The amount claimed as due on the 17th of October for the principal and interest was, on the first mortgage, $4,096,571.83, and on the second mortgage $2,593,255.53. The bill was brought by the trustees, John A. Stewart and Solon Humphrey.

Indianapolis, Bloomington & Western.—Receiver Wright's report for September is as follows:

Balance, Sept. 1	$62,291.84
Receipts	177,788.71
Total	$240,080.55
Disbursements	179,850.89
Balance, Oct. 1	$60,229.66

The disbursements exceeded the receipts by $2,062.18 for the month.

Iowa Central.—This company is adding six stalls to its engine-house at Marshalltown, making 18 in all, is preparing to encase its frame shops there with brick, and has just added to its rolling stock two freight engines and fifty coal cars.

Kankakee & Southwestern.—Work is progressing with great rapidity on this road under the direction of Mr. E. T. Jeffery, Superintendent of the Illinois Central, which will work the road as a branch. There are now 30 miles of track laid, and the whole 37 miles is to be opened next week.

Kansas Pacific.—The United States Circuit Court has decided, on the petitions lately presented, to remove both the present Receivers, Henry Villard and C. S. Greeley, and to appoint a new Receiver. Messrs. Villard and Greeley will retain office, however, until the new appointment is made. The new receiver, it is thought, should be a resident of Kansas and not interested in any way in the road. After some days' delay the Court appointed as sole Receiver Mr. Sylvester T. Smith, Auditor of the road under the late receivers. The appointment of Mr. Smith was made in pursuance of a request to the Court, signed by A. L. Williams, attorney for the Kansas Pacific Railway; Messrs. Hitchcock, Lubeke and Player, solicitors for the complainants; Wallace Pratt, attorney for the Denver Extension bondholders, and T. A. Hurd, attorney for Adolphus Meier, constituting all the representatives of the complainants and defendants in the case.

Kishpaugh Mine.—It is proposed to build a road about five miles long from the Kishpaugh Mine, in Warren County, N. J., to the Delaware, Lackawanna & Western near Buttzville. The mine is owned by the Crane Iron Company, and yields a very fine quality of iron ore.

Logansport, Crawfordsville & Southwestern.—This company is having a line surveyed from Sand Creek, about four miles northeast of Rockville, Ind., down the Little Raccoon valley to Catlin, about five miles south to Rockville to ascertain the cost of building a track between the two points. If they do this and abandon the road through Rockville, both for passenger and freight business, it will leave that place about four miles from any railroad.

Manchester & Keene.—A statement having been published that work on this road had been suspended, and that the laborers had not been paid for their last month's work, and had, many of them, been thrown on the town for support, the contractors, Messrs. Dame & Bannalier, say that the statement is entirely without foundation. They state that the men are paid fully and promptly at the regular periods. The road-bed is now complete, and is ready for iron rails, which will be laid at the rate of three-quarters of a mile per day. It is expected the road will be opened to Harrisville on the 24th inst., when regular passenger trains will be run between Greenfield and Harrisville. The road will be finished by the 20th of November, connecting at Keene with the Ashuelot and Cheshire roads. This road will form a connecting link from Boston, *via* the Boston & Lowell and the Nashua & Lowell railroads, and a direct line to New York, *via* the Keene and Connecticut River road; also a direct line to Troy and the West, *via* the Hoosac Tunnel.

Missouri, Iowa & Nebraska.—Under the arrangement lately made, this company's trains began to run through to Keokuk, Ia., Oct. 15. Heretofore they have stopped at Alexandria, Mo., five miles below Keokuk.

Montclair & Greenwood Lake.—The New York, Lake Erie & Western has acquired control of this often bankrupt railroad, by the purchase from the leading bondholders of a majority interest in the first-mortgage bonds, which, under the reorganization scheme, by which the road was bought at the recent foreclosure sale, will receive the stock in the reorganized company. It is said that of the $700,000 of first-mortgage bonds the purchasing company bought $453,000 at 50 per cent. of their face and a 5 per cent. assessment, which would make the cost of the controlling interest $249,150. The road has had great difficulty in earning enough to pay its expenses, but the purchaser will be able to reduce the latter considerably by using its own entrance into Jersey City, instead of the one now leased of the Hudson Connecting Railway. The line can be made to form a loop of the New York, Lake Erie & Western by extending it a few miles at its northern end, and it may have somewhat injured the value of the Erie's local traffic at a few stations by its competition. There had been talk of extending it to a connection with another valueless road, the Walkill Valley, and taking a considerable milk traffic which the New York, Lake Erie & Western now gets, which would have injured the latter. Though never likely to be worth much, it is probably worth more to the new purchaser than it could be to any one else, and if it is worth little it has cost very little—less than $5,000 per mile; though this gives the control only, not the fee.

The purchases of the bonds are said to have been made from the following parties: $175,000 from Cyrus W. Field and his nephews, $100,000 from Arthur W. Benson, $88,000 from Jesup, Paton & Co., $20,000 from W. C. Sheldon and $70,000 represented by A. S. Hewitt. If all the bonds are reckoned at the same value, the road is worth about $10,000 per mile.

New York Central & Hudson River.—The Albany *Argus* says: "Superintendent Priest, of the Central-Hudson, has designated Little Falls as the point at which all freight-train crews are changed. This point is located exactly midway between the extreme ends of the middle division of the road. Train crews run from Little Falls to West Albany and return, and westward from Little Falls to the De Witt yard and return. This arrangement, which was partially put in force a year or two ago, has proven so satisfactory that it will probably be continued indefinitely. It adds fully 800 inhabitants to the population of the place." The distance from Little Falls to West Albany and De Witt is about 72 miles, and by this arrangement the train crews are left at home at the end of every tour of service, which takes from the long engine run system the chief objection that the men have had to it.

New York, Lake Erie & Western.—The third rail was laid through Paterson, N. J., on the 17th. It looks as if standard-gauge cars might be able to run through from Buffalo to New York by the 1st of November.

New York & New England.—This company is building a bridge to connect its tracks with 25 acres of the South Boston Flats which the state recently leased to it, and the dredging, building of docks, platforms, etc., stipulated in the lease are being done by the state.

On the 18th inst. the company took possession of the Hartford, Providence & Fishkill road by decree of the United States Circuit Court by the exercise of its equity of redemption as successor of the Boston, Hartford & Erie Company.

This gives the New York & New England Company a line of 150 miles, from Boston to Waterbury. It also obtains control of the Providence Division, from Willimantic to Providence, 58 miles; also, of the Boston & Woonsocket road, 34 miles, and the Stockbridge Branch, 18 miles, making 260 miles in all. It leases, besides, the Norwich & Worcester and the Rhode Island & Massachusetts roads. The corporation has out $3,400,000 of bonds, covering all its possessions, including the uncompleted portion of the road between Waterbury and Fishkill. Mr. Clark, the manager, says that no more bonds will be issued except for the development of the line westerly, and that it will require only about 60 days to put the road in running order to the Hudson River. It is not probable, however, that anything will be done before Spring. The amount of bonds the company has the right to issue is $10,000,000. Old Berdell bonds are now convertible into stock of the new company, and were selling at 31⅓ in Boston and 33 in New York. Six months ago bonds sold for 11. The managers expect in a few days to put on through trains from Boston to Hartford, and connect here with the New York, New Haven & Hartford road.

New York & Oswego Midland.—At a meeting of the holders of the certificates of the Receivers of this road in New York, Oct. 23, at which two-thirds of the whole amount of certificates were represented, a resolution was adopted to select a committee of seven, with authority to confer with the committee of the first-mortgage bondholders, and arrive, if possible, at some practical and satisfactory agreement to the end that the railroad property may be transferred to the hands of the persons who are the real owners, namely, a "Successor Company" in which they shall be represented, and after such conference an agreement be prepared to be submitted to the holders of Receivers' certificates for signature embodying such plan as may be agreed upon; and that the committee have no power to make any agreement, and they be requested to submit no plan which does not recognize the right of certificate-holders to the priority established in their favor by the decree; and report at as early a day as possible at a future meeting of the holders of Receivers' certificates.

The committee appointed consists of Ex-Mayor Wm. H. Wickham, Mr. Thos. Dickson, Mr. W. H. Fenner of the Rhode Island Locomotive Works, Judge O. S. Williams of Clinton, N. Y., Mr. J. J. Davenport, Jr., of Richmond, Mr. W. O. McDowell and Mr. William C. Whitney, Corporation Counsel of New York.

New York & Sea Beach.—The Brooklyn Common Council last Monday granted a franchise to E. A. Hunt, Wm. B. Scott and M. Turman Hunt to run a ferry from a point on New York Bay between Forty-fifth and Forty-sixth streets (in Gowanus Bay) and the city of New York, in connection with the New York & Sea Beach Railroad, which extends from Coney Island toward Brooklyn, but lacks three or four miles of completion to the bay. It has not been worked for two years.

Northern Pacific.—The Chief Engineer, Col. W. Milnor Roberts, arrived in New York last week after an absence of two months engaged in making a survey in Washington Territory through the Cascade Mountains. He has had two parties of 20 men each engaged in the surveys, working toward each other.

North & South, of Georgia.—After long delay the sale of this road to satisfy the lien of the state upon it has been finally completed and the deed ordered to be delivered. The purchasers are a number of residents of Columbus, Ga., who intend to extend the road to a junction with the Atlanta & West Point. It is now 23 miles long, from Columbus to Hamilton, and is of 3 ft. gauge.

Oil Transportation.—In Pittsburgh, Oct. 17, the Pennsylvania Supreme Court decided to allow the bills presented by the Attorney General, alleging conspiracy to control the oil business and discrimination in rates, to be filed, but required regular notice to be given to the defendant corporations of the intention to move for a preliminary injunction. Argument on that motion will be heard during the term beginning Nov. 4. The first point to be decided will be whether the matters complained of are such as to require state action, or whether they are within the limit where redress can be had by individual actions.

Pennsylvania.—The following statement of the business of all lines of this company east of Pittsburgh and Erie for September, 1878, as compared with the same month in 1877, shows:

A decrease in gross earnings of	$147,702
A decrease in expenses of	15,242
A decrease in net earnings of	132,520

The nine months of 1878, as compared with the same period of 1877, show:

An increase in gross earnings of	$813,660
A decrease in expenses of	554,632
An increase in net earnings of	1,368,292

All lines west of Pittsburgh and Erie for the nine months of 1878 show a deficiency in meeting all liabilities of $391,062, being a gain over the same period in 1877 of $225,964.

Pittsburgh, Cincinnati & St. Louis.—This company's report for the nine months ending Sept. 30 is as follows:

Gross earnings	$2,306,330
Expenses (64 per cent.)	1,477,377
Net earnings	$828,953
Interest on bonds, nine months	502,342
Surplus	$326,611

Gross earnings include interest received on equipment hired, and expenses include interest on car-trust cars and rental of Monongahela Extension in Pittsburgh.

Pittsburgh & Lake Erie.—The track on this road is now all down from Youngstown, O., to Middletown, Pa., 58 miles, leaving about nine miles to be completed to reach Pittsburgh. This section is all graded, the iron is ready, and it is hoped that trains will run through over the whole road by the end of this month. The bridge over the Ohio at Rochester has been completed, and trains running over it for several weeks.

Pittsburgh, Wheeling & Kentucky.—This company is reported to be getting on average about 25 cars of freight daily to deliver at Wheeling, W. Va.

Port Huron & Northwestern.—Work on the grading was begun in Port Huron, Mich., Oct. 21, and it is to be completed speedily to Davisville. John M. Glavin has the contract. A subscription of $28,000 has been guaranteed, which will be available as soon as the trains are running. Davisville, it is said, will be reached in two months, and an extension be made to Carsonville next year. From Port Huron the route is north to Fort Gratiot; thence northwestward through Gratiot Centre, Clyde, Grant township and Worth township to Davisville.

Southeastern, of Canada.—The repair shops of this road are to be established at Waterloo, Pa.

Spring Valley.—Articles of incorporation of this company were filed with the Secretary of State of West Virginia, Oct. 17. The purpose is declared to be the construction of a railroad from Oil Spring Run on the lands of George Rutherford in Ritchie County, W. Va., up the valley of the run to its head, and across the ridge to the low gap between White Oak Fork of Wasker's Creek in Wood County, and Lick Run of Meyer's Fork in Ritchie County, with nine short branches. There are 200 shares, of $25 each.

St. Louis, Iron Mountain & Southern.—It is "unofficially announced" that the litigation between this company and the English bondholders represented by Baring Brothers has been amicably settled by a compromise. The details of the agreement are now being settled by a committee. The understanding is that the Allen-Marquand management is to be continued.

Train Robbers Attacked.—A telegram says that the sheriffs of three Kansas counties, with a strong force of men, early in the morning of the 19th discovered, surprised and attacked the rendezvous of a gang of train robbers west of Brookfield, Kan., about 200 miles west of Kansas City. Mike Rourke, said to be the leader of the gang that robbed a train on the Atchison, Topeka & Santa Fe at Kingsley, and also one on the Kansas City, St. Joseph & Council Bluffs at Winthrop, was captured, but four others succeeded in getting away, one of them wounded, closely followed southward by the sheriffs' force. It is extremely important that the gang be caught, as it or others similar has introduced a new element of danger in the running of trains west of the Mississippi.

Valley, of Virginia.—At a meeting of stockholders residents in Virginia, held in Lexington, Va., last week, it was resolved to appoint a committee to press upon the Baltimore & Ohio the necessity of completing the road. In case that company does not take any action, the committee is instructed to seek from the Shenandoah Valley or any other company, proposals for the completion of the road, and for its lease or transfer to the company which may be willing to finish it. Should this also fail and should there be no further prospect of resuming work, it was resolved that the company should be dissolved and its charter forfeited.

The company has 26 miles of completed road, from Harrisburg, Va., to Staunton, and a large part of the grading is done from Staunton to Salem, on the Atlantic, Mississippi & Ohio. The stock is about evenly divided between the Baltimore & Ohio, the City of Baltimore and the counties along the line, only a very little being held by individuals.

Wabash.—The report filed by this company with the United States Circuit Court at Springfield, Ill., for the four months ending with August, gives the following:

Gross earnings		$1,653,737
Operating expenses		1,248,764
Net earnings		$404,973
Payments, except for operating expenses:		
For rental	$34,151	
Taxes and insurance	65,025	
On account of Wabash Equipment Co	56,000	
Purchase of P. L. P. Co. cars	13,463	
Purchase of Madison Co. R. R.	5,867	
Interest on funded debt	285,705	
		$460,212
Payments over net earnings		$55,239

ANNUAL REPORTS.

Western Maryland.

This company owns a line from Baltimore west by north to Williamsport, Md., 90 miles, and it works the Emmitsburg Branch, from Rocky Ridge to Emmittsburg, 7 miles, making 97 miles in all. The latest report is for the year ending Sept. 30, 1878.

The city of Baltimore owns a controlling interest in the road, and has indorsed most of its bonds. The company leases its station in Baltimore from the city and the tracks leading through the city from the Northern Central Company.

The stock and bonds are as follows:

Stock ($7,599 per mile)	$683,933
Bonds ($40,833 per mile)	3,675,000
Total ($48,432 per mile)	$4,358,933

Interest upon part of the bonds is in arrears. The work done for the year was as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Locomotive mileage	419,331	378,196	I. 41,135	10.9
Passengers carried	368,956	339,111	I. 29,845	8.8
Passenger mileage	7,411,061	6,582,241	I. 828,820	12.6
Tons freight carried	136,021	131,367	I. 4,654	3.5
Tonnage mileage	5,180,982	4,692,089	I. 488,893	10.4
Average receipt:				
Per passenger per mile	1.90 cts.	2.07 cts.	D. 0.17 ct.	8.2
Per ton per mile	3.48 "	3.47 "	I. 0.01 "	0.3

The passengers were classified as follows: Full fare, 164,799; two-thirds fare (clergymen), 2,284; half-fare (children), 5,588; commutation and mileage, 78,111; and excursionists, 118,224; total, 368,956.

The earnings for the year were as follows:

	1877-78.	1876-77	Inc. or Dec.	P. c.
Passengers	$140,925.70	$136,662.27	I. $4,263.43	3.2
Freight and express	180,773.09	167,686.49	I. 13,086.60	7.8
Milk and market	17,934.88	15,717.78	I. 2,217.10	14.1
Mails, etc	7,567.96	12,019.33	D. 4,451.37	37.1
Total	$347,201.63	$332,085.87	I. 15,115.76	4.6
Expenses	217,275.43	219,940.57	D. 2,665.14	1.2
Net earnings	$129,926.20	$112,145.30	I. $17,780.90	15.9
Gross earn. per mile	3,579.40	3,423.57	I. 155.83	4.6
Net " " "	1,339.45	1,156.14	I. 183.31	15.9
Per cent. of exps	62.58	66.23	D. 3.65	5.5

The above statement of gross earnings does not include $29,317.61, earned upon the tracks of other roads east of Fulton station, (in Baltimore) the trackage or tolls paid by this company being identical with the rates charged the public for the service, and being full for such service, there was nothing from this source to credit to earnings of this company, and in consequence the whole amount was treated as a division of joint business and excluded from the aforegoing statement. In 1877 the amount so earned and paid over was $28,214.95 and in 1876, $25,486.32.

The report says: "During the year important progress

and large expenditures have been made in strengthening the equipment, increasing depot, siding and other facilities, substituting steel for iron rails, introducing permanent structures for temporary or perishable ones, ballasting with stone, increasing excursion facilities, etc., etc. In this manner, $72,870.16 of the net earnings have been applied, and it will be found advisable to pursue the same course for several years to come, in order to place the road under the most favorable conditions for safe and economic operation. The company's ability to prosecute and hasten this important work must soon be greatly increased by its earnings from new sources, while such additional traffic will not materially increase the cost of operating."

In order to accommodate and encourage the excursion business, the most attractive features of the Blue Ridge adjacent to the road have been controlled and many improvements made at different points, such as pavilions, restaurants, carriage-drives, etc. The company has refused offers to dispose of these facilities and intends to keep them. A company has been organized to build a large summer hotel on the line of the road in the mountains.

The report says, in conclusion: "The matter of the purchase by the city (Baltimore) of the second preferred bonds of the company, which has already been brought to the attention of the Mayor and City Council and the City Finance Commissioners, has much to commend it, and the directors on the part of the city will be prepared at the proper time to present the matter and show the important advantages the city may thus gain.

"During the year important progress has been made upon the Baltimore & Hanover, and the Baltimore & Cumberland Valley railroads, and there is every reason to believe that the influence of both, as operating roads, will be felt by this company before the close of another year."

Central, of Georgia.

The lines worked by this company are as follows:

	Miles.
Central Railroad:	
Savannah, Ga., to Macon	192.0
Gordon to Eatonton	39.0
Augusta Branch, Millen to Augusta	53.0
Total Savannah Division	284.0
Atlanta Division, Macon to Atlanta	102.5
Total Central R. R.	386.5
Southwestern Railroad:	
Macon, Ga., to Eufaula, Ala	143.0
Muscogee Branch, Fort Valley, Ga., to Columbus	71.0
Fort Gaines Branch, Cuthbert to Fort Gaines	20.0
Albany Branch, Smithville to Albany	23.5
Blakeley Extension, Albany to Arlington	35.5
Perry Branch, Fort Valley to Perry	12.5
	305.5
Upson County R. R., Barnesville to Thomaston	16.5
Total worked	708.5

The road owned is the line from Savannah to Macon, the Eatonton Branch and the Atlanta Division, 333.5 miles; the Augusta Branch and the Southwestern road are leased, and the Upson County road controlled and worked. The company also owns one-half interest in the Western Railroad of Alabama; the Ocean Steamship Company, whose lines run between Savannah and New York; and controlling interests in the Mobile & Girard and Vicksburg & Brunswick roads, besides large interests in other connecting lines. From advanced copies of President Wadley's report for the year ending Aug. 31, 1878, the following statements are taken.

The earnings of the various lines for the year were as follows:

	1877-78.	1876-77.	Inc. or Dec.	P. c.
Central R. R., Savannah Div.	$1,389,008.27	$1,219,475.95	I. $169,532.32	13.9
Central R. R.; Atlanta Div.	537,820.35	497,883.55	I. 39,936.80	8.0
Southwestern R. R.	739,223.28	683,935.45	I. 55,287.83	8.1
Upson County R. R.	9,266.54	7,797.26	I. 1,469.28	18.8
Total earnings	$2,675,318.44	$2,409,092.21	I. $266,226.23	11.1
Expenses:				
Savannah Div.	824,279.94	821,255.06	I. 3,024.88	0.4
Atlanta Div.	309,937.36	294,424.91	I. 15,512.45	5.3
Southwestern R. R.	438,996.02	458,257.24	D. 19,261.22	4.2
Upson County R. R	8,137.60	8,229.65	D. 92.05	1.1
Total exps.	$1,581,350.92	$1,581,166.86	D. $815.94	0.1
Net Earnings:				
Savannah Div.	$564,728.33	$398,220.89	I. $166,507.44	41.8
Atlanta Div.	227,882.99	203,458.64	I. 24,424.35	12.0
Southwestern R. R.	300,227.26	225,678.21	I. 74,549.05	33.0
Upson County R. R.	1,128.94	*432.39	.....	....
Total net earn.	$1,093,967.52	$826,925.35	I. $267,042.17	32.3
Central R. R. Bank	46,305 61	30,761.35	I. 15,544.26	50.5
Bank expenses.	16,963.46	16,198.25	I. 765.21	4.7
Bank net profits.	$29,342.15	$14,563.10	I. $14,779.05	101.2
Total net earn.	$1,123,309.67	$841,488.45	I. $281,821.22	33.5

* Deficit.

The average results for the two years were as follows:

	1877-78 Gross earn. pr. m.	1877-78 Net earn. pr. m.	1877-78 P. c. of exps.	1876-77 Gross earn. pr. m.	1876-77 Net earn. pr. m.	1876-77 P. c. of exps.
Central R. R., Savannah Div	$4,891	$1,988	59.34	$4,294	$1,402	67.32
Atlanta Div.	5,247	2,217	57.63	4,857	1,985	59.14
Southwestern R. R.	2,420	983	59.39	2,239	739	67.00
Upson County R. R.	562	68	87.81	473	.....	105.55
All lines.	$3,776	$1,544	59.11	$3,400	$1,167	65.67

The improvement on the Savannah Division is largely due to the recovery from the loss inflicted during the prevalence of yellow fever at Savannah in the fall of 1876, and fully confirms the statements to that effect made in last year's report. The increase on the Atlanta Division is considerable and due chiefly to steady growth of traffic. The Southwestern road, whose business is chiefly local, shows also a gratifying increase in earnings.

The report says: "Keeping in view reasonable economy in the management of your affairs, the gradual improvement of your property has been looked to, and it is confidently believed to be in a better condition than at any previous date. In the renewal of rails steel has been adopted, except to the extent that can be supplied by re-rolling the worn-out iron, paying in old rails for re-rolling. During the past year there have been 3,000 tons of steel rails placed in the track. We have added 50 freight cars to our stock, besides making extensive improvements to our stock of passenger and baggage cars. In the engine department, one new engine has been built in the shops in Savannah, and extensive repairs made on all our motive power.

"Extensive repairs have been made to our buildings and an addition to our shops in Macon has been commenced, and considerable progress made toward completion. This improvement will enable us to concentrate our work by closing up the shops in East Macon, and will result in a positive saving in expense. * * *

"In December last, after a very careful review of the financial condition of the company, the board determined upon the resumption of dividends (of which the stockholders had been deprived for the past three years), keeping them at a figure that would enable us to create a sinking fund of not less than $100,000, to provide for maturing obligations of the company. In accordance with this determination, a dividend of 2½ per cent. was declared in December, and another of like amount in June. While the board would be very glad to pay a larger dividend than this, it is believed that it would not be prudent to do so, at least for the present. The wisdom of providing for the maturing obligations of the company has been proved by the gradual but steady appreciation of its stock and bonds. Its credit—always good—is now established upon a firm basis."

The business of the Ocean Steamship Company (owned by this company) has been so large that extra steamers had to chartered. Two new steamers have been ordered and built, in addition to the two built the previous year. All four were built by John Roach & Son.

The report refers with regret to the retirement of Gen. E. P. Alexander from the management of the Western Railroad of Alabama. From his successor, Mr. Gabbett, a young but energetic man, much is hoped. The report further says of the Western road: "The earnings of that road for the year ending Aug. 31 show a very gratifying increase over the previous year, the net result being $76,127.97 greater than for the year ending on Aug. 31, 1877. Within the past month or six weeks the earnings, especially in the passenger traffic, have been seriously affected by the epidemic that has been prevailing in New Orleans. Should this cease at an early day and the business of the road continue to improve for the coming year as for the past, it will be no longer a charge upon its owners.

"The obligations of the contract between this company and the Georgia Railroad Company for a partition of that part of the Western Railroad from Opelika to West Point and Columbus, have been acknowledged by the President of the Georgia Railroad Company, but that company does not wish to take the West Point end for the present, and as there appears to be no special reason for urging an immediate partition, the matter has been allowed to remain as at the date of the last report.

"Reference was made in the last report to a settlement that had been made with the Mobile & Girard Railroad Company, and the board takes pleasure in reporting that the business of that road is meeting the expectations then entertained. Its earnings have been equal to its interest, and there has also been a marked improvement in the condition of the property."

The claim of the State on the Upson County road for taxes is unsettled. The health and sanitary condition of Savannah has been good, and no trouble is expected from epidemic there while as much care is taken as at present.

The report says, in conclusion: "The Southern Railway & Steamship Association, to which reference has been made in the last two annual reports, is yet in operation, and it is hoped that the improvements which have been made in its organization will enable it to fulfill the expectations of its projectors; but the board are fully aware of the difficulties to be overcome, and whether this company and its dependencies will continue in it, must depend upon its ability to oblige the parties associated to keep good faith. If that cannot be accomplished, it will then clearly be the duty of your company to protect its interests outside of the Association."

LOCOMOTIVE RETURNS, JULY, 1878.

Master Mechanics of all American railroads are invited to send us their monthly returns for this table.

Name of Road.	Number of miles operated	Number of Locomotives in service	Mileage. Total	Mileage. Average per Engine.	No. Miles run to Ton of Coal	No. Miles run to Cord of Wood	No. Miles run to Pint of Oil	Average No. of freight cars hauled	Average cost per freight car per mile, cents	Cost per Mile in Cents for Repairs	Fuel	Stores	Miscellaneous	Engineers, firemen and wipers	Total	Average Cost of Coal per ton.	Wood per cord
																$	$
Allegheny Val., River Div.*	139	41	83,625	2,040	44.86	.....	27.03	22.10	0.737	3.82	3.00	0.45	.....	6.14	13.41	.....	.....
Low Gr'de Div.*	120	18	36,820	2,046	35.87	.....	20.95	20.30	0.763	2.93	3.17	0.59	.....	5.97	12.66	.....	.....
Atlantic & Great Western, 1st & 2d Divs.	228	83	211,431	2,547	43.98	.....	18.01	16.10	.....	3.60	4.57	0.43	0.68	5.86	15.14	1.93	2.84
3d & 4th Divs.	197	50	133,527	2,671	41.87	.....	30.66	16.90	.....	4.00	4.03	0.26	0.65	5.50	14.44	1.66	2.84
Mahoning Div.	88	52	115,489	2,221	46.58	.....	21.89	17.70	.....	3.56	4.24	0.33	0.49	5.51	14.13	1.88	2.84
Atlantic & Gulf.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
California Pacific	152	13	31,091	2,392	36.68	.....	19.53	.....	.....	9.84	16.77	0.51	0.56	7.46	35.14	6.00	5.75
Cen. Pac., Western Div.†	227	60	159,451	2,658	40.73	.....	16.55	.....	.....	5.90	14.97	0.51	0.58	7.64	29.60	6.00	5.75
Visalia Div.†	157	9	26,322	2,925	54.31	.....	16.72	.....	.....	3.97	11.22	0.47	0.18	6.73	22.57	6.00	5.75
Tulare Div.†	171	11	23,540	2,140	43.43	.....	12.74	.....	.....	5.38	14.01	0.62	0.30	8.05	28.36	6.00	5.75
Los Angeles, San Diego, Yuma & Wilmington Divs.†	408	17	43,274	2,546	65.61	.....	15.01	.....	.....	4.73	9.34	0.53	0.18	7.55	22.33	6.00	5.75
Sacramento Div.†	120	37	80,093	2,165	.....	29.14	15.92	.....	.....	4.45	19.73	0.52	0.51	9.28	34.49	.....	5.75
Oregon Div.†	152	7	21,588	3,084	32.10	68.92	21.06	.....	.....	1.44	18.35	0.42	0.16	8.41	28 78	6.00	5.75
Truckee Div.†	205	26	58,697	2,258	40.34	32.80	17.87	.....	.....	4.46	16.13	0.47	0.53	8.55	30.14	6.00	5.75
Humboldt Div.†	201	19	46,795	2,463	48.84	.....	20.36	.....	.....	6.31	12.49	0.40	0.21	7.57	26.98	6.00	5.75
Salt Lake Div.†	219	27	68,838	2,549	38.73	.....	14.82	.....	.....	6.07	15.67	0.59	0.53	7.50	30.36	6.00	5.75
Chicago & Eastern Illinois‡	159	29	80,310	2,769	40.01	.....	15.00	.....	.....	3.98	2.89	0.34	.....	5.85	13.06	.....	.....
Cleve., Col., Cin. & Ind., Columbus Div.	138	58	162,212	2,779	46.47	58.73	29.68	.....	.....	2.02	4.46	0.41	0.58	5.87	13.34	1.92	2.75
Indianapolis Div.	203	64	191,914	2,992	47.80	43.18	22.81	.....	.....	3.90	4.23	0.53	0.95	5.58	15.19	1.75	2.75
Cincinnati Div.	130	33	82,466	2,496	46.36	.....	19.97	.....	.....	2.30	3.67	0.58	0.88	5.91	13.34	1.55	2.75
Cleveland & Mahoning Valley.	41	6	14,183	2,837	52.14	.....	21.68	10.60	.....	4.65	3.44	0.28	1.20	6.08	15.65	1.64	2.61
Cleveland & Pittsburgh*	225	77	158,717	2,061	53.67	.....	19.26	16.90	0.939	3.16	2.52	0.42	2.62	6.35	15.07	1.20	3.20
Del., Lackawanna & Western, Bloomsburg Div.§	80	20	50,638	2,532	.....	.....	31.18	.....	.....	18.00	.....	0.52	.....	4.46	22.98	.....	.....
Erie & Pittsburgh*	98	29	59,732	2,060	46.24	.....	18.22	17.70	0.751	2.39	3.49	0.44	2.04	6.31	14.67	1.61	1.61
Grand Trunk, Portland Div.	.....	41	88,234	2,152	46.71	.....	.....	19.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Eastern Div.	.....	59	154,194	2,614	.....	.....	.....	20.80	.....	.....	.....	.....	.....	.....	.....	.....	.....
Champlain Div	.....	11	19,888	1,808	57.04	.....	.....	16.90	.....	.....	.....	.....	.....	.....	.....	.....	.....
Central Div.	.....	128	323,194	2,524	49.25	.....	.....	23.10	.....	.....	.....	.....	.....	.....	.....	.....	.....
Western Div.	.....	87	192,267	2,210	52.16	.....	.....	19.50	.....	.....	.....	.....	.....	.....	.....	.....	.....
Buffalo Div.	.....	22	64,389	2,927	60.21	.....	.....	17.10	.....	.....	.....	.....	.....	.....	.....	.....	.....
Detroit Div.	.....	18	51,797	2,878	35.66	.....	.....	19.80	.....	.....	.....	.....	.....	.....	.....	.....	.....
Green Bay & Minnesota	240	12	25,781	2,148	76.00	45.50	11.59	9.82	.....	2.56	5.53	0.52	0.05	5.02	13.68	3.75	2.50
Houston & Texas Central‖	498	59	136,127	2,307	53.20	44.10	16.40	.....	.....	3.90	6.87	0.51	1.12	6.55	18.97	3.50	3.38
Ill. Cen., Chicago Div.¶	253	61	159,796	2,620	38.46	.....	16.49	18.53	.....	2.50	4.86	0.28	.....	5.84	13.48	1.75	4.20
South Div.¶	227	28	63,341	2,262	41.86	.....	15.80	13.96	.....	5.16	4.48	0.29	.....	5.82	15.75	1.75	4.20
North Div.¶	231	35	73,390	2,097	37.69	.....	15.76	12.69	.....	5.33	4.93	0.28	.....	6.03	16.58	1.75	4.20
Springfield Div.¶	113	10	20,271	2,027	43.31	.....	20.43	13.89	.....	3.37	3.53	0.26	.....	5.34	12.50	1.45	2.65
Iowa Div.¶	401	38	90,615	2,385	39.10	.....	17.62	11.97	.....	3.47	7.63	0.27	.....	6.02	17.41	2.60	4.90
Jeff'nville, Madison & Ind's*	226	43	93,557	2,176	45.46	28.80	13.59	20.34	0.880	4.07	5.83	0.45	2.27	5.78	18.40	2.50	2.25
Kansas Pacific	744	66	155,741	2,360	29.69	.....	12.77	..	.....	7.07	11.83	0.47	.....	6.93	26.30	3.49	2.90
Kansas City, St. Jo. & Council Bluffs**	271	31	92,033	2,969	65.40	.....	27.30	.....	.....	4.00	4.30	0.30	.....	6.60	15.20	2.65	3.25
Lake Shore & Mich. Southern, Buffalo Div.‡	.....	89	194,886	2,189	44.19	45.65	24.04	.....	.....	3.66	6.82	0.27	.....	5.79	16.54	2.85	5.69
Erie Div.‡	.....	113	230,588	2,040	39.87	.....	30.35	.....	.....	3.66	6.65	0.23	.....	5.70	16.28	2.51	5.43
Toledo Div.‡	.....	85	137,615	1,619	34.76	57.48	21.31	.....	.....	4.72	8.45	0.33	....	5.75	19.28	2.92	4.08
Mich. Southern Div.‡	.....	208	376,716	1,811	45.09	69.19	20.93	.....	.....	4.62	7.35	0.28	.....	5.97	18.10	3.35	4.63
Little Rock, Miss. River & Tex.	100	4	7,804	1,951	.....	81.00	13.00	.....	.....	3.00	2.70	0.40	2.20	8.80	17.10	.....	2.25
Louisville, Cin. & Lexington‡	.....	.....	100,398	.....	35.26	.....	12.94	.....	.....	2.64	6.67	0.45	1.83	5.89	17.48	2.11	3.00
Louisv'e & Nash., First Div.‡	332	57	110,981	1,947	35.58	.....	19.62	.....	.....	4.34	6.47	0.28	1.30	7.04	19.43	2.02	2.40
Second Div.‡	200	36	77,654	2,157	37.31	.....	12.11	.....	.....	4.09	5.68	0.45	2.12	6.18	18.52	2.06	2.50
Memph. Div.‡	131	14	37,090	2,649	43.61	.....	14.27	.....	.....	5.14	7.34	0.42	2.01	6.08	20.99	3.15	2.30
Nashville & Decatur Div.‡	122	16	35,781	2,236	36.08	.....	12.70	.....	.....	4.45	7.58	0.54	2.34	6.54	21.45	2.57	3.10
S. & N. Alabama R. R.‡	183	28	56,937	2,033	39.60	.....	12.60	.....	.....	4.56	5.85	0.64	1.33	6.17	18.55	2.19	2.42
Marq., Hought'n & Ontonagon	88	23	36,268	1,577	43.54	.....	22.89	68.84	.....	1.19	9.56	0.47	.....	5.52	16.74	4.00	.....
Northern Central, Elmira & Canandaigua Divs.	147	45	95,669	2,126	36.23	.....	20.83	.....	.....	5.44	4.62	0.56	.....	5.62	16.24	1.60	2.00
Penn., New York Div.††	120	118	297,644	2,522	39.66	.....	11.16	.....	.....	4.30	7.80	0.80	.....	.....	12.90	3.00	4.80
Amboy Div.††	154	40	78,233	1,956	60.48	.....	20.66	.....	.....	3.60	5.10	0.40	.....	.....	9.10	3.00	4.80
Belvidere Div.††	103	34	56,045	1,648	43.35	.....	13.64	.....	.....	3.50	7.10	0.50	.....	.....	11.10	3.00	4.80
Philadelphia Div.††	191	147	376,292	2,560	31.36	.....	16.08	.....	.....	4.20	4.10	0.60	.....	.....	8.90	1.20	2.64
Middle Div.††	132	91	260,243	2,860	35.70	.....	21.19	.....	.....	5.10	3.50	0.40	.....	.....	9.00	1.20	2.64
Pittsb'h Div.††	221	176	407,195	2,314	30.80	.....	13.89	.....	.....	7.30	4.00	0.60	.....	.....	11.90	1.20	2.64
Tyrone Div.††	107	32	59,241	1,851	21.70	.....	21.93	.....	.....	8.60	5.60	0.50	.....	.....	14.70	1.20	2.66
West Penn. Div.††	104	23	42,849	1,863	43.08	.....	33.76	.....	.....	7.60	2.90	0.30	.....	.....	10.80	1.20	2.64
Lewistown Div.††	56	5	10,536	2,107	41.12	.....	19.84	.....	.....	0.70	3.00	0.40	.....	.....	4.10	1.20	2.66
Bedford Div.††	57	5	8,682	1,736	38.51	.....	27.78	.....	.....	6.80	3.20	0.30	.....	.....	10.30	1.20	2.75
Pitts., Fort Wayne & Chicago, Eastern Div.*	371	147	350,395	2,384	49.91	.....	21.59	16.50	0.823	2.49	3.12	0.37	1.47	6.21	13.66	1.50	1.56
Western Div.*	280	101	261,515	2,589	41.60	.....	17.50	24.90	0.471	3.21	3.69	0.35	2.91	5.87	16.03	1.66	1.66
Pitts., Cin. & St. Louis, Little Miami Div.*	197	37	99,132	2,679	50.51	.....	13.50	17.36	0.747	3.84	4.25	0.45	2.34	5.57	16.45	2.10	2.00
P., C. & St. L. Div.*	224	90	229,632	2,551	34.97	.....	21.81	20.17	0.770	6.04	2.37	0.38	2.25	5.62	16.66	0.75	2.60
Pittsb'gh, Titusville & Buffalo*	158	20	38,260	1,913	45.44	.....	22.20	19.50	1.067	5.45	3.67	0.48	.....	5.86	15.46	.....	.....
St. Louis, Iron Mt. & So., Arkansas Div.	325	32	80,255	2,508	.....	44.40	14 30	.....	.....	2.69	5.62	0.48	.....	6.37	15.16	.....	2.50
St. Louis & San Francisco	328	....	77,180	.....	39.30	.....	14.50	.....	.....	2.70	5.30	0.34	.....	5.62	13.96	2.10	1.80
St. Louis & S. E., St. L. Div.	208	...	57,370	.....	47.80	.....	19.60	.....	.....	4.03	2.31	0.27	.....	5.50	12.11	1.00	.....
Nashville Div.	145	...	58,000	.....	32.50	.....	16.20	.....	.....	4.12	2.47	0.26	.....	5.97	12.82	0.77	.....
Stockton & Copperopolis	49	3	5,113	1,704	32.67	.....	11.62	.....	.....	8.87	19.78	0.85	0.85	7.90	38.25	6.00	5.75
West Jersey††	128	18	47,998	2,667	48.98	.....	21.19	.....	.....	3.00	7.00	0.40	...	.....	10.40	3.40	3.93

* Five empty cars rated as three loaded ones.
† Switching engines allowed 6 miles per hour; helping engines, actual distance run and 4 miles per hour while waiting trains.
‡ Switching engines allowed 6 miles per hour. § Fuel not estimated.
‖ Switching and work-train engines allowed 6 miles per hour; no switching mileage allowed to train engines.
¶ Two empty cars rated as one loaded one. ** Three empty cars rated as two loaded ones.
†† Engineers', firemen's and wipers' wages not included in cost per mile run.
The ton of coal is 2,000 lbs., unless otherwise noted; 25 bushels counted to the ton.